A Report of the Center for Counterproliferation Research

The Counterproliferation Imperative

Meeting Tomorrow's Challenges

National Defense University

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Meeting Tomorrow's Challenges

Center for Counterproliferation Research
National Defense University
Fort Lesley J. McNair
Washington, D.C. 20319

November 2001

Contents

Figures and Tables

Foreword

The horrific events of September 11, 2001, serve as a painful reminder that America, for all its strength and vitality, remains at risk in a changing and sometimes unpredictable world. In the wake of this tragedy, the 2001 *Quadrennial Defense Review* underscores that "the war the nation fights today is not a war of America's choosing." Yet in every period of its history the United States has faced unique challenges both to its role in the wider world and its very way of life. Just one decade ago, the United States and Soviet Union ended a lengthy and bitter Cold War rivalry. More than 4 decades before that, the United States, together with its allies, stared down the specter of fascism. Today, we fight again to preserve democracy and freedom, but the enemies we face are far more elusive, and the threats far more fluid, than those of the 20th century.

Beyond conventional warfare considerations, the United States now faces an acute challenge in nuclear, biological, and chemical (NBC) weapons proliferation—a principal asymmetric warfare capability. These weapons pose a diverse array of risks to U.S. and allied armed forces, civilians, and to the U.S. homeland itself. In the hands of irresponsible or aggressive states, NBC weapons undermine regional stability and threaten U.S. and allied interests. For defense planners, these weapons present significant, and difficult, strategic and operational challenges. Nor is the emerging threat limited solely to state actors: in the future, some subnational entities, perhaps with state sponsorship, could become capable of delivering NBC weapons globally.

Speaking at the National Defense University in May 2001, President George W. Bush rightly argued that these nations and groups present a new and grave threat to the United States: "They hate our friends. They hate our values. They hate democracy and freedom and individual liberty." In response, "we must seek security based on more than the grim premise that we can destroy those who seek to destroy us. This is an important opportunity for the world to rethink the unthinkable and to find new ways to keep the peace. Today's world requires a new policy, a broad strategy of active nonproliferation, counterproliferation, and defenses."

The unprovoked September 11 attack has led to an international coalition seeking to combat terrorism. While the terrorists who attacked

the World Trade Center and Pentagon did not employ NBC weapons, their actions leave little doubt that such weapons, had they been available, would have been used. That morning of terror triggered the beginning of a new battle, an assault against the forces of international terrorism whose goal it is to cause mass death and destruction in the United States and abroad. As part of this effort, the United States is redoubling its fight against the proliferation of NBC weapons and technology and vigorously seeking to improve its ability to operate in NBC environments.

The May 2001 conference hosted by the Center for Counter-proliferation Research and this resulting monograph contribute to today's vital counterproliferation effort. By laying out the progress made since the early 1990s and the challenges yet to be overcome, this report provides a needed and comprehensive appraisal of the implications of NBC weapons, their use, and U.S. countermeasures and responses. This report provides timely and expert guidance and advice for American policymakers as they formulate national plans and policies to deter and defend against NBC threats in the years ahead.

We have entered an era in which our conventional military might, while still critically important, is vulnerable to NBC attacks and other asymmetric threats. New thinking about today's challenges is required. This monograph provides the foundation for comprehensive discussion both on the role of counterproliferation in evolving U.S. defense strategy and on tomorrow's NBC challenges.

Paul G. Gaffney II
Vice Admiral, U.S. Navy
President
National Defense University

Acknowledgments

The National Defense University Center for Counterproliferation Research convened a large-scale, multi-day conference in May 2001 to assess the state of the field with respect to counterproliferation plans, policies, requirements, and operations; identify and discuss a number of contemporary policy, organizational, technical, and operational issues; and highlight key facets of the Bush administration's emerging national security policy. The conference was sponsored by the Office of the Secretary of Defense, the Joint Staff, and the Defense Threat Reduction Agency. It drew widespread participation from each of these offices as well as many of the warfighting and supporting commands, other Federal agencies, and nongovernmental specialists.

This monograph is grounded in, but further elaborates on, the presentations and discussion conducted in that forum. While all sessions were off the record and all comments delivered on a nonattribution basis, the authors would like to thank the many conference speakers and panelists for their contributions to, and/or review of, this product. In particular, project directors John Reichart and Jason Ellis would like to thank the following key participants: Vice Admiral Paul Gaffney, Roy Alcala, Bruce Bennett, Ken Bernard, Elaine Bunn, Ash Carter, Seth Carus, Lewis Dunn, Michèle Flournoy, Torrey Froscher, Jeff Grotte, Read Hanmer, Theodore Hardebeck, Maj Gen Ron Henderson (Ret.), Rebecca Hersman, Tom Hopkins, Brig Gen Raymond Johns, Robert Joseph, Maj Gen Timothy Kinnan, Ron Lehman, CAPT Timothy Lindstrom, David Martin, Frank Miller, Vayl Oxford, MG John Parker, Keith Payne, Gary Resnick, Brad Roberts, Brig Gen Klaus Schafer, BrigGen Keith Stalder, and David Stephens. We would also like to thank Paul Bernstein for his substantial contributions to this report and Phil Gardner, Forrest Waller, and the rest of the Science Applications International Corporation support team for their considerable and highly effective efforts to organize and implement this large-scale event. Although this product benefited from their active involvement, the opinions expressed herein are those of the Center alone and may not reflect those of any particular conference speaker, the National Defense University, the Department of the Army, or any other department or agency of the U.S. Government.

Chapter One

Introduction

Today, the sun comes up on a vastly different world. . . . Yet, this is still a dangerous world, a less certain, a less predictable one. More nations have nuclear weapons and still more have nuclear aspirations. Many have chemical and biological weapons. Some already have developed the ballistic missile technology that would allow them to deliver weapons of mass destruction at long distances and at incredible speeds. And a number of these countries are spreading these technologies around the world.

Most troubling of all, the list of these countries includes some of the world's least responsible states. Unlike the Cold War, today's most urgent threat stems not from thousands of ballistic missiles in Soviet hands, but from a small number of missiles in the hands of these states, states for whom blackmail and terror are a way of life. They seek weapons of mass destruction to intimidate their neighbors and to keep the United States and other responsible nations from helping allies and friends in strategic parts of the world.

—George W. Bush[1]

The proliferation of nuclear, biological, and chemical (NBC) weapons poses major strategic and operational challenges to the United States and an important political challenge to the international community. In the hands of hostile states, these weapons threaten stability in key regions, put U.S. forces at risk, and undermine the U.S. ability to project power and to reassure friends and allies. Increasingly, the American homeland is at risk as well. U.S. intelligence officials routinely warn that more than a dozen states are actively pursuing offensive chemical or biological weapons programs. Moreover, the 1998 Indian and Pakistani nuclear tests, as well as lingering concerns over the status of the North Korean program, underscore the continuing nuclear aspirations of key states. Many states also seek ballistic and, increasingly, cruise missiles or other platforms capable of delivering NBC payloads. Proliferation trends point to a problem of growing complexity: a deepening of NBC capabilities among current proliferators; the spread of NBC-relevant technologies that comprise "virtual" capabilities for would-be future proliferators; and the growing potential for subnational or state-sponsored NBC terrorism.

The international nonproliferation regime is likely to have only limited impact in controlling these developments for states determined to acquire, develop, or use NBC capabilities. Indeed, history suggests that determined proliferators will find a way to work around the political and practical constraints they confront. It was for this reason that, in chartering the Defense Counterproliferation Initiative in 1993, Secretary of Defense Les Aspin declared, "we are making the essential change demanded by this increased threat . . . adding the task of protection to the task of prevention."[2] The need to prepare to fight NBC-armed adversaries was a principal lesson of the Gulf War. U.S. and allied forces were inadequately prepared to confront Iraqi chemical and biological weapons, and most of our coalition partners were even less well prepared. Moreover, postwar revelation of the scope of Iraqi NBC activities sent shockwaves throughout the national security community, surprising even "informed" observers and highlighting serious potential vulnerabilities in U.S. regional security strategies and warfighting plans. While Iraq did not, ultimately, use chemical or biological weapons in the Gulf War, its manifest ability to do so, coupled with its evident (and largely undetected) technical progress, underscored the emergence of a major new defense planning challenge.

Defense planning must now directly confront the possibility of asymmetric warfare with NBC weapons in future confrontations with actors unable to challenge U.S. conventional military dominance. Under the right circumstances, such weapons afford adversaries a tool of coercion as well as a potential force multiplier—an opportunity, as the 1997 *Quadrennial Defense Review* concluded, "to circumvent or undermine our strengths while exploiting our vulnerabilities." For this reason, the use of chemical and biological weapons, in particular, must now be viewed as a "likely condition of future warfare."[3]

The Department of Defense (DOD) defines *counterproliferation* as the "full range of military preparations and activities to reduce, and protect against, the threat posed by nuclear, biological, and chemical weapons and their associated delivery means."[4] Major elements include:

- maintaining a strong deterrent
- developing capabilities to identify, characterize, destroy, and interdict the production, storage, and weaponization of NBC weapons
- developing active defenses
- training and equipping our forces to operate effectively in an NBC-contaminated environment
- developing the ability to manage the consequences of NBC use

- encouraging our allies and coalition partners to make counterproliferation a part of their military strategy
- supporting diplomacy through arms control and export control.

While significant progress has been made in achieving these capabilities since 1993, much remains to be done. This monograph describes the current state of the field with respect to the intelligence, policy, operational, and programmatic issues related to counterproliferation. It seeks to present the counterproliferation imperative within the broader context of strategy and deterrence developing in the Bush administration and highlights key contemporary issues. Finally, the monograph suggests areas for future emphasis in improving our understanding of the NBC threat and in further developing appropriate responses.

Chapter Two

The NBC Threat: Perspectives on Intentions and Capabilities

The counterproliferation community has devoted significant effort over the last decade to developing working propositions on the NBC threat and the manner in which it may present itself in actual confrontations with regional aggressors. Despite continuing gaps in hard intelligence, the result of this effort has been to facilitate an important evolution in thinking on the threat. Ten years after the Gulf War, analysts have a more nuanced appreciation of NBC weapons and the manner in which they could be used by adversaries to achieve specific objectives against the United States or a U.S.-led coalition. The defense policy, operational, and intelligence communities' perceptions of the changing threat include several evolving features.

The threat is not monolithic. The tendency to think about NBC weapons as a more or less single threat gradually is changing to a greater differentiation in terms of both threat and response. While the term *weapons of mass destruction* retains some political utility, our thinking increasingly reflects the more complex reality that NBC weapons differ considerably across a range of attributes, including their ability to inflict mass-destruction effects. Indeed, each weapon type presents a distinct problem requiring an appropriately varied framework for analysis. Viewing biological warfare through the prism of chemical warfare is no longer adequate; doing so would perpetuate old misconceptions and complicate efforts to develop the unique responses required by the nature of the biological weapons (BW) threat. Similarly, nuclear and radiological weapons vary considerably both from each other and from chemical and biological weapons. Adversaries may elect to employ one or more weapon types to inflict either varied or synergistic effects.

The threat is asymmetric. NBC weapons are now widely viewed as integral to the larger concept of asymmetric threats by which less capable adversaries will seek to counter U.S. advantages. This means NBC weapons are intended not only to counter U.S. nuclear capabilities as a "poor man's atomic bomb" but also to exploit perceived vulnerabilities in U.S. and allied conventional operations and political will. Accordingly,

NBC weapons cannot be viewed solely as last-resort weapons, because adversaries may well see their early use as a key to victory; and they may brandish NBC weapons for coercive purposes in an effort to break coalition cohesion. In support of a defined strategy, use may be tactical (for example, against a key military node) or strategic (for example, against a city), with potential timing of use ranging from early to late and with potential effects ranging from disruptive to catastrophic. Because U.S. political will is a potential target, we cannot expect U.S. or allied territory to be a sanctuary from NBC attack in the context of a regional war with a rogue nation. The theater of war is, in fact, global. In support of asymmetric strategies, adversaries may use NBC weapons in combination with other unconventional capabilities (such as information operations) designed to counter U.S. strategies and forces.

Nor is the NBC threat confined to state actors. While states are a principal focus of concern, terrorists and other nonstate actors have become increasingly important for the intelligence, law enforcement, and national security policy communities to watch. The continuing diffusion of technology, the ongoing risk of diversion of weapons-related expertise, and the clear willingness for some subnational actors to contemplate mass destruction or disruption together foreshadow a future that may not closely resemble the past. As the September 2001 anthrax attacks underscore, the American homeland is at risk. And, of course, NBC-capable states may share their capabilities with terrorist or other subnational organizations. The potential combination of state-level capabilities and resources and an emergent mass-casualty motive structure among particular subnational organizations poses a challenging and potentially dangerous convergence of problems. How this convergence may play out in the context of a war on terrorism is unclear, but the trend line is generally unfavorable in this respect.

NBC weapons have operational utility. In the past, many assumed that effective employment of NBC weapons was simply too hard for lesser-developed powers. Today, the operational utility of NBC weapons is more widely acknowledged. These weapons will not always be easy for adversaries to use effectively, but the integration of chemical warfare capabilities in particular into the forces and doctrine of key proliferators of concern indicates that these states have given deliberate thought to how best to employ them. Many contemporary analyses reflect this trend, and important initiatives designed to translate our understanding of operational utility into a more effective chemical weapons (CW) defensive posture are under way. In contrast, the United States is much less far along in developing defensive postures to cope with the unique problems likely to be created by the use of biological weapons. Closing this deficit is a high pri-

ority for the future. With respect to nuclear weapons, one should not discount potential adversary attempts to use them tactically—for example, generating an electromagnetic pulse intended either to cause disruptive effects or to serve as a demonstration or escalatory warning shot.

Appreciation also has increased for the fact that NBC weapons have utility below the level of mass destruction and that mass-destructive effects will not always result from their use. Even where such effects are possible, the adversary may use these weapons in such a way as to explicitly avoid them. The adversary may opt to avoid mass-destructive effects for deliberate operational reasons or perhaps to keep from crossing a threshold perceived as likely to trigger a devastating response. Or, despite an intention to do so, the adversary may prove unable to achieve such effects due to technical, operational, climatological, or other considerations. For these reasons, the counterproliferation community now more clearly understands the possibility of limited and low-lethality applications. This is especially the case for biological weapons, given the significant number of available incapacitating agents. But it is also true for chemical weapons, given the recognized need to better understand low-level (and long-term) CW effects.

NBC weapons have strategic utility. An aggressor need not have a highly effective tactical NBC capability to achieve important effects. One clear lesson of the Gulf War was that even conventionally armed ballistic missiles could have strategic impact by altering the political dynamics of a coalition. The credible capability to hold friendly cities and other important civilian assets at risk with NBC weapons could confer significant strategic advantages to a regional aggressor, even if its overall NBC capability was limited. Missiles may be a preferred way to manifest this capability for purposes of coercion (at least until effective missile defenses are in place), though other means also exist to threaten strategic targets. Conceivably, the mere possession of nuclear weapons could embolden a rogue state and encourage risk-taking behavior. It could also raise the likelihood that chemical or biological weapons would be employed for coercive or operational purposes or to demonstrate the capability to escalate—while holding in reserve a nuclear "trump card" to hedge against regime defeat or leverage more favorable war-termination terms. Key command-and-control facilities, logistics nodes, staging areas, and other traditional rear areas may be particularly attractive targets for a biological attack. Moreover, on this expanded battlefield, civilian assets may become prime strategic targets, and the theater of operations is likely to include both traditional areas of operation and also the United States and/or allied homelands.

Adversaries are probably comparing notes. The 1990s saw a notable increase in the transfer, exchange, and sale of NBC- and missile-related information and technology among key states, both consumers (for example, North Korea, Iran, and Pakistan) and suppliers (for example, Russia, China, and North Korea). Moreover, because the United States is a common antagonist to many states of proliferation concern, planners and strategists from these countries reasonably can be expected to share perspectives on how to leverage NBC weapons in confronting both the United States and U.S.-led coalitions. These discussions most likely would be focused not only on the present but also on future U.S. forces based on the revolution in military affairs. To such actors, the United States plausibly has a strategic personality that, if understood, would yield insights into U.S. vulnerabilities and how to exploit them. For instance, insofar as the United States is perceived to be casualty-averse, the ability to inflict large-scale casualties may prove attractive to a potential adversary. We need a better understanding of how adversaries perceive U.S. strategic culture, how they may collude in developing NBC strategies under present and future conditions, and how tacit or opportunistic collaboration may threaten U.S. interests in a collateral area of operation in the midst of a conflict elsewhere.

The Intelligence Challenge

The Intelligence Community (IC) views its core mission as providing policymakers with unique, high-value information on proliferation trends and activities. Most of this effort is focused on the daily challenge of tracking the activities of key states of proliferation concern (for example, Iran, Iraq, and North Korea), the growing network of these "secondary" proliferators, and the technology transfers from Russia and China that support these activities. Also of particular concern are the activities and intentions of states such as Syria and Libya, the nuclear and missile rivalry between India and Pakistan, the continuing development and spread of weapons-usable technologies, the potential leakage of material and expertise from key states, the improvement of deception and denial practices, and other related issues.

For a number of reasons, the IC faces an increasingly complex challenge in confronting NBC proliferation. The threat is dynamic with respect to both motivations and means to acquire NBC weapons.

Motivations. Proliferation pressures appear to be growing, driven largely by regional security dynamics, the availability of technology, and nascent arms competitions in strategically important areas. Most prospective U.S. adversaries view NBC weapons as important counters to U.S. conventional military strength and power projection capabilities. Impor-

tant proliferation thresholds are being crossed, such as the transition in states like Iran and Pakistan from short-range to medium-range ballistic missiles. Chronic proliferation problems with Iraq and North Korea remain unresolved. At the same time, the constraints provided by international norms and technology controls are under increasing pressure. The activities of insincere adherents to the nonproliferation regime erode confidence in the regime. And there is a perception in some quarters that states outside the regime—such as India and Pakistan—pay little price for their continuing proliferation activities.

Means. States seeking NBC weapons enjoy more technological options today than in the past, and anticipated advances will accelerate this trend. While an extensive set of traditional biological warfare agents already exists—any one of which could seriously threaten military operations and civilian populations—genetic engineering creates the potential for a vastly expanded menu of BW options, complicating efforts to project and understand the evolving and emerging threat. In the chemical arena, so-called novel (or fourth-generation) agents are in danger of becoming more widely proliferated. And even as more states are developing or acquiring ballistic missiles, an increasing interest in cruise missile technology is evident. The future will hold more sources of materiel and know-how as secondary suppliers emerge from the ranks of regional proliferators and become increasingly capable net exporters of NBC-related (but often dual-use) technology. As these technologies continue to spread, as indigenous production potential increases, and as timelines for weapons development shorten, the potential for surprise grows.

According to Director of Central Intelligence George Tenet, "more than ever we risk substantial surprise. This is not for a lack of effort on the part of the Intelligence Community; it results from significant effort on the part of proliferators." Tenet sees four main reasons for this:

First and foremost, proliferators are showing greater proficiency in the use of denial and deception.

Second, the growing availability of dual-use technologies—including guidance and control equipment, electronic test equipment, and specialty materials—is making it easier for proliferators to obtain the materials they need.

Third, the potential for surprise is exacerbated by the growing capacity of countries seeking WMD to import talent that can help them make dramatic leaps on things like new chemical and biological agents and delivery systems. In short, they can buy the expertise that confers the advantage of technological surprise.

Finally, the accelerating pace of technological progress makes information and technology easier to obtain and in more advanced forms than when the weapons were initially developed.[5]

The absence of fully informed, real-time assessments of political intentions in these states further reinforces this uncertainty.

In light of these trends, the IC clearly faces a major challenge in enhancing its technical depth in disciplines related to NBC weapons and delivery means. Beyond the critical task of recruiting skilled personnel, a fundamental challenge for the IC is to understand the ways in which the dynamic threat environment increases uncertainty and the prospects for surprise.

Thinking About and Preparing for Surprise

Proliferation surprise is not a new problem, though historically it has been most evident with respect to mistaken estimates of the nature or maturity of specific national programs. Examples include the scope and depth of Iraqi NBC programs at the time of the Gulf War, the developmental and production status of the North Korean long-range missile program, the extent and sophistication of the former Soviet Union BW program, and the clandestine Indian nuclear tests in 1998. These types of surprise still must concern us, especially when the mobilization capability matters more than stockpiles (as with biological weapons). Particularly in nations hostile to U.S. interests, unexpected approaches to acquiring or integrating NBC weapons could have important political and military implications. Our ability to recognize such adaptations should not be assumed, especially if we rely principally on rigidly validated intelligence. Indeed, the states of greatest proliferation concern are also among the hardest intelligence targets; their closed or restrictive political processes often make it difficult to obtain high-fidelity information on such sensitive issues. Information on adversary capabilities, plans, and intentions may not be available, may be fragmentary or misleading, or may change quickly. Rather, we must prepare for a range of operating conditions and regional circumstances in an effort to mitigate the effects of surprise. This capabilities-based approach is central to the 2001 *Quadrennial Defense Review*: an effort to "anticipate the capabilities that an adversary might employ to coerce its neighbors, deter the United States from acting in defense of its allies and friends, or directly attack the United States or its deployed forces."[6]

An equal danger is that we will experience surprise of a more *strategic* nature, which could take the form of the emergence of significant but unexpected proliferator states (for example, allies or friends responding to regional proliferation developments), unknown capabilities (such as those acquired covertly from external sources), or unanticipated operational concepts for the employment of NBC weapons. Adversaries may use NBC weapons in ways we expect and believe we understand. But they may also

make choices with respect to timing, agents, and targets that defy conventional wisdom. Or, they may succeed in areas U.S. specialists thought unlikely—as the former Soviet Union's reported success in weaponizing both plague and marburg suggests, even as U.S. weaponeers researched and discounted the prospects for the former and devoted only modest resources to understanding the weaponization potential of the latter.

The capacity for adversaries to achieve surprise is rooted in a number of factors. In some cases, doctrine for the use of NBC weapons may not be formalized or documented or may instead be closely held by a small number of specialists or senior officials. The overexposure of U.S. intelligence efforts is a problem as well: if adversaries know too much about what we are looking for and the principal sources and methods used, the task of concealment and deception is greatly eased. Perhaps most serious is the persistence of mindsets that channel U.S. expectations and estimates into canonical assumptions about how competent, well-organized, resource-constrained, or risk-tolerant adversaries may be. These assumptions in turn can lead to flawed judgments about the "when, where, and how" of NBC use. For instance, some analysts remain incredulous that state-level adversaries would ever actually employ NBC weapons against U.S. equities for fear of nuclear retribution. Others suggest that while normative or other constraints may be a factor, adversaries may instead interpret perceived limitations differently. Moreover, constraints may not override operational and strategic incentives for adversary NBC employment. Indeed, many analysts find the threat credible and point to potential uses that conceivably fall below the nuclear response threshold or for which attribution is problematic. Ground truth is likely to remain elusive in the absence of additional real-world data or experience and will likely vary by actor and by specific situation. To the extent possible, our planning must account for plausible, if unexpected, events; we mirror-image or unduly constrain ourselves to the limited or fragmentary quantity of information available at our own peril.

Broader based threat assessments that consider unexpected proliferation developments could focus on identifying plausible, actor-specific surprise scenarios and evaluating the implications for current intelligence estimates, collection and analysis activities, national policies, investment strategies, and operational plans. Principal objectives would be to identify critical vulnerabilities and the steps required to address them and to both diminish the prospects for and mitigate the implications of surprise. Over time, a sustained effort is required to institutionalize a process of alternative analysis that challenges prevailing assumptions about the threat. From specialized training of individual analysts to structured "red-teaming" of estimates and vulnerability assessments, a greater level of resources and

management attention must be devoted to developing and considering alternative assessments of how adversaries may integrate, brandish, and use NBC weapons. This process should, as appropriate, include the perspectives of our allies. Improving threat assessment is a difficult task but an important one if we are to avoid being captive to preconceptions and intellectual biases that will heighten the likelihood of strategic surprise.

Employing active diplomatic and operational measures to dissuade adversaries from employing, and where possible, developing, NBC weapons and missile delivery vehicles is a principal task of national efforts to combat proliferation. At the same time, preparing for and mitigating the effects of surprise also means maintaining a robust counterproliferation science and technology base capable of supporting hedging strategies against emerging (and to some degree unpredictable) threat developments. Likewise, the more capable forces are of operating in contaminated environments, the more resilient they will be in facing NBC surprise on the battlefield.

Chapter Three

Counterproliferation Policy: Current and Emerging Issues

The [1997] Quadrennial Defense Review *underscored . . . two key challenges as part of its strategy to ensure future NBC attack preparedness. It must institutionalize counterproliferation as an organizing principle in every facet of military activity, from logistics to maneuver and strike warfare. It must also internationalize those same efforts to ensure our allies and potential coalition partners to train, equip, and prepare their forces to operate with U.S. forces under NBC conditions.*

—Secretary of Defense Annual Report to the President and the Congress[7]

Policy Objectives

The Gulf War led to a fundamental reassessment of Cold War-era views on the operational utility of NBC weapons for our adversaries, the strategic implications of NBC threats or employment, the efficacy of deterrence in a regional context, and the requirements for operations in NBC environments. This evolution in thinking about the NBC threat and adversary use concepts informs the ongoing work of the policy community across the counterproliferation pillars of counterforce, active defense, passive defense, and consequence management (see figure 1 and chapter 5, below), and in related areas such as deterrence, doctrine, and international cooperation. This work proceeds from a recognition of several important realities: that U.S. forces are likely to confront chemical and biological weapons on a future battlefield; that NBC weapons may be leveraged early for coercion or in support of anti-access strategies; that strong distinctions are required in analyzing and responding to NBC weapons; that across this spectrum, BW defense requires much greater attention; and that coalition and host-nation considerations are of great importance.

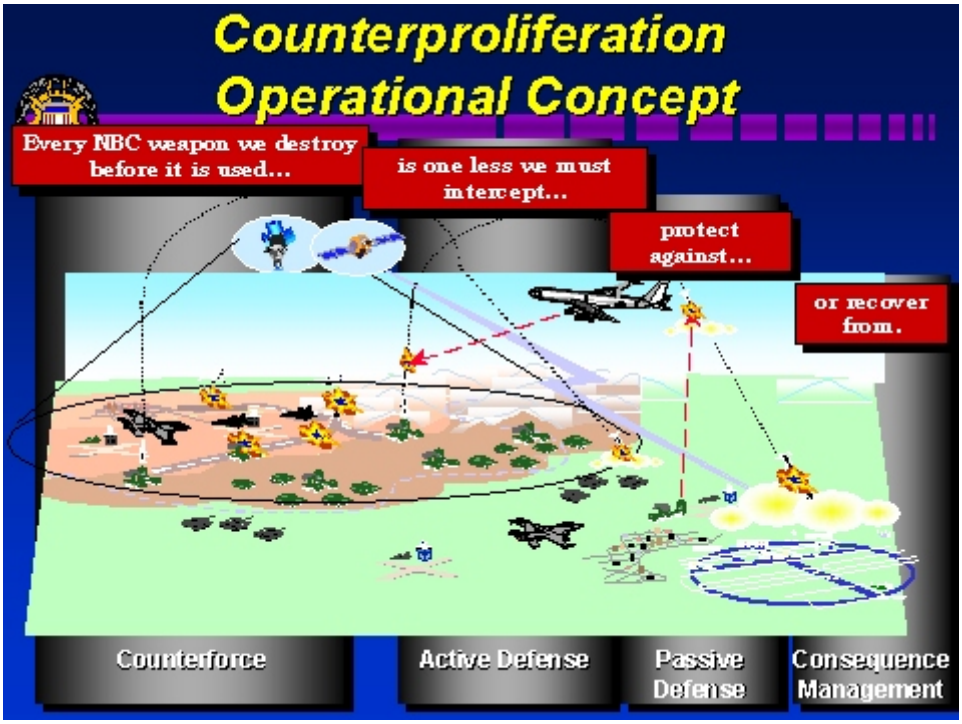
The twin goals of institutionalizing and internationalizing counterproliferation established in the 1997 *Quadrennial Defense Review* provide important benchmarks for success as policy direction and specific initiatives are formulated and executed. Thus, it is useful to take stock of counterproliferation as a broad organizing principle for defense policy and planning. While considerable progress has been made, significant chal-

lenges remain to complete DOD transformation and to more effectively operate in a combined or multinational setting in future endeavors.

Completing the Counterproliferation Conversion

The vision articulated in 1993 with the creation of the Defense Counterproliferation Initiative has only partly been realized. Some capability has been built, but not yet enough to declare success. Across the defense establishment, many see counterproliferation as a pivotal issue, but for some the vision of military excellence that defines future warfighting largely excludes counterproliferation. Those who still question the rationale for counterproliferation generally view the NBC threat as either inherently unmanageable or easily deterred. Either way, they question the wisdom or feasibility of the mission. To complete the transformation process necessary to successfully wage war on future battlefields, DOD must continue to press both the "software" and "hardware" challenges imposed by the critical counterproliferation mission.

Figure 1: Counterproliferation Operational Concept (JCS/J5, 2000)



Management Considerations

In part, counterproliferation has suffered from being characterized as a joint acquisition activity. While the Goldwater-Nichols Defense Reorganization Act directed that warfighting be conducted jointly, the acquisition system is still dominated by the military services. Until jointness is better institutionalized as an acquisition imperative, counterproliferation will be vulnerable in Washington budget battles—a vulnerability reinforced by the absence of an "iron triangle" of influential industry, service, and Congressional advocates. Strengthening the process by which a single commander in chief (CINC)—a Joint Forces Commander—defines truly joint warfighting requirements would likely help.

A more fundamental problem is that counterproliferation is a mission that has lacked a clear managerial focus. Within DOD, it cuts across a number of functional and regional domains. And the larger counterproliferation mission is genuinely an interagency function. Despite the rhetorical emphasis routinely accorded counterproliferation, to date little effort has been made to consolidate direction, authority, and accountability for the overall counterproliferation mission. Some argue that the White House could have a positive impact here, but only if staff in multiple offices are empowered to perform program oversight, not just policy coordination. To this end, they would recommend a multi-year, multi-agency counterproliferation program over which the White House maintains managerial oversight as a means to better focus counterproliferation activities. Others argue that the White House is ill suited to program management activities and suggest instead that increased Presidential attention, the availability of sufficient resources, and improved DOD management and interagency coordination would help focus efforts and achieve results.

The Bush administration appears prepared to make counterproliferation a prominent, national-level priority. For DOD, the 2001 *Quadrennial Defense Review* specifies four key elements of emergent defense strategy: assuring allies and friends; dissuading potential adversaries; deterring threats and countering coercion against the United States, its forces, and friends and allies; and decisively defeating an adversary.[8] It calls for developing missile defenses "as a matter of priority" and enhancing denial capabilities to mitigate the effects of attack if deterrence fails. In this context, it requires the development of counterforce capabilities that can "deny sanctuary" to adversary assets, particularly NBC-related facilities, missile launchers, and other related targets.[9] It implicitly recognizes the need for U.S. forces to improve their ability to manage the consequences of NBC attacks rapidly and effectively and suggests a key role for improved defensive and medical countermeasures against chemical and, especially, biological weapons. Finally, it suggests the need to

conduct effective postwar operations, in particular to seize, dismantle, and destroy an adversary's residual NBC weapons and associated delivery means and infrastructure and to begin remediation of NBC-contaminated environments.

At the national level, a Senior Director for Proliferation Strategy, Counterproliferation, and Homeland Defense is now on the National Security Council staff, and the Office of the Vice President also has focused on this area (for example, through a major interagency review of homeland defense activities). Most recently, President Bush authorized the creation of a new, robust White House Office of Homeland Security. These developments are positive steps that, if well-coordinated, may help overcome the institutional biases, barriers, and dysfunctions that have hampered DOD counterproliferation efforts since 1993.

Transforming Biodefense

Even as the threat posed by biological weapons is expected to grow in the years ahead, the DOD approach to biological weapons defense has in fundamental respects been shaped by the chemical defense paradigm developed in the Cold War. But any lingering tendency to view biological defense principally as an extension of traditional chemical defense doctrine must yield to a paradigm shift that recognizes the unique nature of the BW threat. The traditional defensive template emphasizing avoidance through technical detection, protection through elaborate individual and collective protective ensembles, and decontamination has only limited application in a biological environment. In particular, the inherent limitations of technical biodetectors make avoidance strategies problematic. In light of this weakness, doctrine should place greater emphasis on meteorological forecasting and medical surveillance, perhaps in conjunction with improved air sampling technologies when available. Because climatic conditions can be an important factor in the timing and locations of BW attacks, integrating meteorological forecasting and reporting into doctrine can help identify higher-risk time windows. A strong medical surveillance system can provide timely warning that a biological event has occurred, thereby accelerating the process of making a definitive diagnosis and initiating treatment. To protect personnel from what is largely a respiratory threat, serious consideration should be given to simple, inexpensive mask concepts.

Far from being "too hard," improved biodefense may be possible if grounded in sound principles. Between the current inadequate technical detection-based approach and the ideal of perfect biodefense, military operators stand to benefit from an incremental approach. The required paradigm shift is one that recognizes and operationalizes prevention and re-

sponse concepts found in the public and occupational health arenas. Adapting thinking and planning in this direction will be a challenge but is essential if practical measures are to be made available to the warfighter to manage the risks associated with biological warfare.

Thinking Nationally—and Internationally

Counterproliferation must be viewed both as a national and an international security priority and not simply as a warfighting mission. Ultimately, DOD is concerned about prevailing in regional conflicts in which NBC weapons are used. But the threat has implications that extend far beyond the regional CINCs and requires a response that engages communities well beyond DOD. If continental U.S.-based forces are a potential target of an NBC-armed regional adversary, large numbers of civilians are also at risk, thereby engaging the interests and capabilities of government at all levels. If U.S. forces are to have long-term protection against the BW threat, the expertise of the medical and public health communities must be leveraged effectively. If only U.S. forces enjoy protection against NBC threats, our assumptions about coalition warfare are likely to be challenged. In these and many other ways, a narrow conception of counterproliferation will encumber policymakers' efforts to understand the complex nature of the threat and to leverage the many sources of expertise required to craft an effective response—in DOD, the interagency community, state and local governments, the private sector, and the international community.

> *The proliferation of weapons of mass destruction and their means of delivery are increasingly a fact of life that first must be acknowledged and then managed. While striving to prevent further proliferation remains essential, a determined state may, nonetheless, succeed in acquiring weapons of mass destruction and increasingly capable missiles.*
>
> *—Donald Rumsfeld* [10]

Recognizing the importance to future military operations of working with allies and coalition forces, policy officials have made cooperation with appropriate international partners a priority. While only a limited initiative in the early 1990s, the effort to internationalize counterproliferation is increasingly mature and productive. In key regions, the United States is working to develop a common understanding of the threat and to encourage allies and coalition partners to equip and train their forces to enhance interoperability under NBC conditions. In the North Atlantic Treaty Organization (NATO), these efforts center on the Senior Defense Group on Proliferation, a senior consultative group; the NATO Weapons of Mass Destruction Centre, which coordinates information sharing; and a number of a bilateral activities with key allies focused on chemical and biological

defense issues. Large-scale exercises have engaged key coalition partners in Asia and the Middle East, and bilateral working groups have been established with South Korea, Japan, Israel, Egypt, and other states.

Chapter Four

Operations in NBC Environments: Perspectives on the Warfight

The capability to defend against NBC attacks and sustain combat operations in NBC environments requires forewarning and properly trained and equipped forces throughout the theater. U.S. forces must be prepared to conduct and sustain operations in NBC environments with minimal degradation.
—*Joint Publication 3–11,* Operations in NBC Environments[11]

General Perspectives from Key Warfighting Regions

Translating counterproliferation objectives into operational practice is one of the principal challenges facing the warfighter, requiring credible threat assessments, well-developed plans and operational concepts, effective equipment, realistic training, and coordination with allied and coalition forces. While these joint and combined challenges are most acute on the Korean Peninsula and in Southwest Asia, the integrated list of CINC-specified counterproliferation priorities (table 1) has applicability for all warfighting and supporting CINCs.

Because many defense analysts assess that early and large-scale use of chemical weapons by North Korea is likely should war erupt, the United States faces a serious NBC threat on the Korean Peninsula. Although U.S. knowledge of North Korean NBC capabilities is not definitive (for example, potential gaps in our information about stockpiles and production capacity), chemical warfare in particular appears fully integrated into North Korean operational doctrine and plans. The forward divisions of South Korean forces are especially vulnerable, as are the large number of civilians within range of the North's chemically armed tactical weapon systems. North Korean short- and medium-range ballistic missiles also pose a chemical (and possibly biological) threat to more distant targets of operational and strategic importance, such as air and sea ports of debarkation (A/SPODs), tactical air bases, the territory of Japan, and other rear-area targets. Much less well understood, but potentially of even greater significance, is the threat posed by Pyongyang's biological warfare capabilities—a key concern of the recent *Coral Breeze* exercise series and

one that is likely to grow in importance as a factor in U.S. operational planning. While we have begun to understand the potential scope of the North Korean BW challenge, much work remains to be done to meet this threat effectively.

Table 1: CINC-Identified Counterproliferation Requirements (January 2001)

1	Provide industrial protection to forces and assist allies/coalition partners with relief from NBC effects
2	Detect and monitor development, production, deployment, employment, and transfer of weapons of mass destruction and determine vulnerabilities
3	Communicate the ability/will to employ interdiction/response capabilities
4	Intercept the conventional delivery of WMD with minimal collateral effects
5	Detect and monitor use of WMD
6	Conduct off-site attack to destroy, disable, and deny WMD targets
7	Communicate the ability and will to employ defense capabilities
8	Establish and maintain relations with allies and potential adversaries to discourse development, production, and use of WMD
9	Provide collective protection to forces and assist allies/coalition with relief from the effects of NBC
10	Seize, destroy, disable, and deny transport of WMD
11	Conduct information warfare to destroy, disable, and deny WMD development, production, deployment, and employment

12	Determine vulnerabilities in decison-making process related to WMD
13	Conduct on-site attack to seize, destroy, disable, and deny WMD targets
14	Provide alternatives to the pursuit of WMD
15	Support treaties, export controls, and political/diplomatic efforts
16	Destroy, disable, and deny actor's non-WMD resources and capabilities
17	Establish/maintain ability to restore from WMD use
18	Provide personnel, training, material, equipment, to support security assistance
19	Provide intelligence collection capabilities in support of U.S. Government nonproliferation efforts

Over the past few years, a principal focus of U.S. Forces Korea and the U.S. Pacific Command has been to understand the challenges in projecting power to and within Korea under the threat of the North's chemically-armed ballistic missiles. In conjunction with the U.S. Air Force, command elements have begun to implement risk-based concepts of operations that may ultimately enhance the prospects for maintaining the time-phased force deployment data flow and sustaining an effective level of tactical air sorties in a chemical warfare environment. A number of important issues still must be resolved to bring this effort to successful completion, including defining decontamination standards for large aircraft and ships essential to strategic lift operations; understanding the risks and tradeoffs involved in adopting less stringent standards as an expedient measure in wartime; fully implementing "split MOPP" (mission-oriented protective posture) procedures at air bases; and, perhaps most importantly, conducting additional testing to confirm the fate of particular chemical agents under a range of conditions.

In Southwest Asia, the U.S. Central Command (USCENTCOM) area of responsibility, the threat is more diffuse than in Korea. In some ways, planning for NBC contingencies is more complex as a result. A wider range of scenarios involving adversary use of NBC weapons must

be considered. Coalition warfare in this theater could involve a broader set of nations, with varying degrees of political and operational vulnerability. U.S. reliance on host-nation and third-country national support for war plan execution creates a considerable degree of uncertainty; more focused attention is required to this potential fault line in U.S. planning. And because it does not have permanently assigned forces, USCENTCOM is somewhat limited in its ability to prepare for NBC contingencies, particularly with respect to training. USCENTCOM has a better understanding of these and related considerations as a result of the *Desert Breeze* series of seminars and games and the Cooperative Defense Initiative. As in Korea, the greatest uncertainties concern the possible threat or use of biological weapons.

Specific Operational Challenges

In both the Korean and Southwest Asian theaters, but also wherever U.S. forces must be prepared to operate in contaminated environments, a number of challenges must be confronted to enhance capability.

The BW threat to operations requires more systematic thought. Our understanding of how the use of biological weapons could affect major theater war is very limited. Given the relative paucity and often dated nature of available data, the analytic community has only limited confidence in casualty prediction estimates. Moreover, we lack a credible medical concept of operations for mass casualty scenarios, and overall we have little appreciation for the physical and psychological disruption BW may cause at the unit level, for broader execution of theater war plans, or for securing larger U.S. strategic aims.

Analytic gaps persist. Many of the traditional, campaign-level models used to analyze military operations are limited in their ability to integrate chemical and biological warfare considerations. A more effective suite of operations research tools is required. Further, a more complete range of military operations needs to be subject to analytic scrutiny for their vulnerability to NBC attacks. While some operations (for example, mobility, logistics, and tactical air) have been carefully studied, others have received relatively less analytic attention (such as naval and amphibious landing operations).

Reliable, accessible, and timely information enables effective operations in NBC environments. Many, if not most, CINC areas of concern relate to gathering and processing the information required to ensure situational awareness and make timely decisions that advance objectives while protecting the force and reducing the threat. This requirement includes real-time intelligence on adversary NBC weapons plans, operations, locations, and movements (including mobile missile operations and hard and

deeply buried targets); standoff detection capabilities to facilitate timely warning and reporting of NBC hazards; and real-time capability to evaluate the consequences of execution (in particular, collateral effects) when considering strikes on NBC targets.

Joint doctrine must encourage the full utilization of information technology but also recognize the limits of technology and the potential vulnerabilities of reliance on information-based systems. Revised doctrine in Joint Publication 1, *Joint Warfare of the Armed Forces*, and 3–11, *Joint Doctrine for Operations in Nuclear, Biological, and Chemical Environments*, has helped the warfighter. But the doctrine development process needs to better align tasks with organizations and ensure that responsibilities for counterproliferation-related tasks are well defined. Consequence management and doctrine specific to operations in a BW environment are areas in which improvement is needed. In addition, joint doctrine is inherently limited by the shortfalls in hard intelligence on adversary intentions, capabilities, and plans. The material in Joint Publication 3–11 on threat considerations is useful at the conceptual level, but as we learn more about specific adversaries, joint doctrine must keep pace. Commanders' guides to assist in the implementation of joint doctrine are being developed and may help address this shortfall.

Counterproliferation software includes joint doctrine but also emphasizes the more detailed operational concepts, tactics, techniques, and procedures, and training and exercises required to implement technology-based solutions. Advanced technologies can be leveraged to achieve force protection and battlefield dominance only if this software is equally robust. Higher-level exercises are equally important. CINC-level exercises across the counterproliferation spectrum (including consequence management) need to be fully integrated into Joint Chiefs of Staff-level exercise programs. The national chain of command also needs to be exercised so that senior officials are given the opportunity for realistic consideration of counterproliferation contingencies, including courses of action for preemption. Finally, a requirement exists to better understand the readiness of our NBC defensive capabilities. In one of its major recent actions, the DOD Counterproliferation Council established an initiative to develop quantitative standards for assessing the readiness of chemical and biological defense capabilities to support mission-essential tasks.[12]

Theater targeting of adversary NBC capabilities is another example of counterproliferation software that requires focused attention and improvement. The U.S. Strategic Command (USSTRATCOM) works with the regional commands to develop strike options for CINC-nominated targets, to include consequence of execution analysis. This activity is expected to grow over the next several years as planning tools improve

and progress is made on tough problems like hard and deeply buried targets. As improved capabilities provide new military options, policy guidance on such issues as preemption and collateral effects must be developed or further refined.

A ***joint planning framework*** for counterproliferation is maturing but is still very much a work in progress. The first Joint Strategic Capabilities Plan tasking for more focused counterproliferation planning appeared in 1996. Subsequently, the contingency plans 0400 and 0500 processes were established, and recently the Joint Staff issued a revised Counterproliferation Strategy. Additionally, a number of joint acquisition programs are in place. But 8 years after the creation of the Defense Counterproliferation Initiative, the Joint Mission Needs Statement and the Capstone Requirements Document that define a joint perspective on counterproliferation programmatic directions and needs remain unwritten. The Joint Requirements Oversight Council has directed that these documents be created as part of an integrated counterproliferation roadmap and investment strategy; USSTRATCOM and the U.S. Special Operations Command have the lead in their development. Other suggestions include developing joint standardized templates to provide a common operational concept for the chemical or biological defense of critical fixed assets, maneuver forces, and other military operations.

Consequence Management and Military Operations

To date, the DOD approach to consequence management has had important payoffs, principally an improved capability to provide military support to civil authorities in response to an act of domestic NBC terrorism. Planning is more robust, important expertise and capabilities have been built, and early concerns about the extent of appropriate DOD involvement in domestic affairs have largely been allayed. But downsides have been evident as well. Most notable among these is that the importance of domestic and foreign consequence management to military operations has largely been discounted. DOD is viewed primarily in its role as a responder to, rather than as a lucrative target for, domestic NBC attacks. In fact, U.S.-based warfighting

> *The employment or threat of nuclear, biological, and chemical (NBC) weapons and other toxic materials pose unique challenges to U.S. military operations worldwide. . . .*
>
> *Commanders have the responsibility to consider the implication of a potential adversary's NBC capabilities not only in the adversary's geographic region, but also in other regions, including the United States.*
>
> *—Joint Publication 3–11* [13]

forces and supporting facilities are plausible targets for such attacks, which may be acts of war perpetrated by a state in conflict with the United States rather than traditionally defined terrorist acts. One presumptive purpose of such an act would be to disrupt and delay U.S. military deployments while striking a psychological blow by demonstrating the vulnerability of the U.S. homeland. This motive fits well within the template of asymmetric conflict. Yet U.S.-based forces and facilities are often inadequately prepared for such contingencies, even as vital resources that could support force protection are devoted to civil support activities. This state of affairs is not sustainable and demands fresh thinking about consequence management and force protection.

Our conception of the NBC threat must be broadened to recognize that domestic military targets may be at risk as part of the warfighting strategy of a state adversary. Power projection forces must be protected by improving installation preparedness and by avoiding an over-commitment of warfighting assets to civil support activities. A reexamination of the Civil Support Team concept may free up some of the necessary resources. In parallel, greater attention is needed to *civil* support to *military* authorities. The ability of a military facility to cope with NBC attacks will depend greatly on local response capabilities. Joint planning and exercises involving DOD and local authorities should include this type of contingency. Significant mutual benefits can be realized if a more balanced approach is taken to enhancing consequence management capabilities for both local communities and DOD facilities.

Overseas, similar challenges confront the Department of Defense. Consequence management is a challenging task for the regional CINCs, given resource limitations, shortfalls in technical expertise and experienced personnel, and the need for continuous training in regions where operating tempo is already high. Yet military support to host-nation consequence management is an important mission as it contributes to deterrence, reassurance, and coalition warfare strategies. Here, too, an appropriate balance must be struck between the requirements of this mission and the needs of warfighting, force protection, and the restoration of operations at U.S. military facilities. It is important that host nations not become overly dependent on the United States for consequence management, as this could degrade the ability of U.S. armed forces to prosecute the war. Host nations need to independently develop and field appropriate consequence management capabilities. At the same time, host-nation medical and other services are likely to play a key enabling role for operations in NBC (and especially biological) environments.

Chapter Five

Counterproliferation Acquisition

As NBC weapons and their means of delivery become more broadly available, we will develop counterforce capabilities that can effectively hold at risk NBC-related facilities (including deep underground facilities), missile launchers and other related targets, while minimizing collateral effects. In particular, we will also require improved defensive and medical countermeasures against chemical and especially biological weapons, to sustain operations in chemical or biological weapons environments. To assure U.S. citizens, as well as friends and allies in the face of NBC threats, U.S. forces must have the means to conduct operations after the cessation of hostilities to seize, dismantle, and destroy an adversary's residual NBC weapons, associated delivery means, and infrastructure, and to begin remediation of NBC-contaminated environments.

—"Guidance and Terms of Reference for the 2001 Quadrennial Defense Review"[14]

Fielding systems that can detect, protect against, mitigate the effects of, and otherwise neutralize or defeat NBC weapons is critical to prevailing in NBC environments. Maintaining robust research and development and acquisition programs is an important element of deterrence and is essential if U.S. forces are to have defense in depth against the range of NBC threats they may encounter, including unanticipated threats or fielded countermeasures. State-of-the-art defensive systems enhance protection of forces and populations, while advanced counterforce capabilities broaden the range of options available to proactively limit exposure to the threat. As capabilities improve, commanders can leverage them through innovative operational concepts and adaptations to tactics, techniques, and procedures. Developing program priorities that reconcile warfighter requirements, technical feasibility, and resource constraints is an ongoing challenge.

The interagency Counterproliferation Program Review Committee (CPRC) was established in 1994 to review the principal activities and programs related to countering proliferation within the Department of Defense, the Department of Energy, and the Intelligence Community. The CPRC is chartered to make recommendations regarding interdepartmental activities and programs to address shortfalls in existing and programmed capabilities. In this context, the group annually identifies areas for capability enhancement (ACEs) in which progress is needed in programs designed to counter NBC and missile proliferation (shown in table 2).[15]

While the list has evolved somewhat since 1994, many identified requirements pose difficult technical challenges that have yet to be fully overcome and may not, in some cases, be successfully met for some time. Of the roughly $6.5 billion programmed against the ACEs annually, DOD contributes the vast majority (almost $6 billion). Approximately two-thirds of this amount has traditionally been allocated to ballistic missile defense.[16]

Table 2: Counterproliferation Program Review Committee Areas for Capability Enhancement (ACEs), 2000

DOD ACE Priority (Rank-Ordered)	ACEs
1	Enable sustained operations in an NBC environment through decontamination and individual and collective protection
2	Detection, identification, characterization, and warning of CBW agents
3	Medical protection against NBC agents, to include vaccine stockpile availability
4	Collection, analysis, and dissemination of actionable intelligence to counter proliferation
5	Ballistic and cruise missile active defense
6	Support for Special Operations Forces and defense against paramilitary, covert delivery, and terrorist NBC threats
7	Target planning for nuclear, biological, chemical, and missile (NBC/M) targets
8	Detection, characterization, and defeat of hard and/or deeply buried targets with minimal collateral effects
9	Detection, tracking, and protection of NBC/M and NBC/M-related materials and components
10	Detection, characterization, and defeat of NBC/M facilities with minimal collateral effects
11	Prompt mobile target detection and defeat
12	Provide consequence management for terrorist use of NBC weapons (including civil support in response to domestic WMD contingencies)
13	Support export control activities of the U.S. Government
14	Support inspection and monitoring activities of arms control agreements and regimes and other nonproliferation initiatives

Directions in Chemical and Biological Passive Defense

The principal factors shaping current efforts in chemical and biological (CB) passive defense are the evolving threat, technology advances, established and emerging mission requirements, organizational roles and missions, and national defense policy. For the foreseeable future, the acquisition community will continue to "chase the threat," which (particularly in the biological arena) is dynamic and in important ways not transparent. Accordingly, a multifaceted approach to CB defense is required, built upon a robust science and technology base, a unique critical technology infrastructure, and coordinated efforts between DOD operators and developers, other government agencies, industry, academia, and allies. Ultimately, the success of the CB defense program will be measured by its ability to meet user needs. These needs, realistically, must recognize that even a highly robust passive defense capability cannot provide a complete solution to the NBC threat. Passive defense must work in conjunction with other and counterproliferation tools.

The Fiscal Year (FY) 2001 "Joint NBC Defense Priority List" contains 34 items focused on the 2007–2025 timeframe. These priorities are derived from intelligence assessments, *Joint Vision 2020* strategy, and service and CINC requirements. Priority list items span the critical areas of contamination avoidance, individual protection, collective protection, restoration capability, medical countermeasures, and NBC battle management. The overall research, development, and acquisition investment strategy reflects the Office of the Secretary of Defense review of these priorities in relation to strategy requirements and fiscal constraints; in general, these priorities emphasize detection requirements more than protection or medical countermeasures. Funding for DOD CB defense activities for the FY02–07 period is expected to average approximately $1 billion annually, inclusive of science and technology base, other research and development, procurement, military construction, and Defense Advanced Research Project Agency activities. Procurement is the largest element in this funding profile, most of which is encompassed in the Joint Service Chemical-Biological Defense Program. Details on individual programs can be found in a number of official DOD documents, including the annual *Chemical and Biological Defense Program, Overview of Joint Service Chemical and Biological Defense Program* and the CPRC *Report on Activities and Programs for Countering Proliferation and NBC Terrorism*. In addition to ongoing science and technology research, development, and procurement activities, a number of important efforts are intended to better define the threat, requirements, and responsive operational concepts.

The Chemical-Biological Threat Agent Program is an effort to better understand, archive, and manage information on the threat by coordinating and integrating the work of the intelligence, science and technology, and operational communities. The program will be built around a center of expertise for managed studies of the CB threat designed to bring an improved understanding of agent operational effects to the warfighter in real mission context. Operations research and systems analysis techniques will be emphasized, supported by a robust CB laboratory structure.

The Low-Level Chemical Warfare Agent Working Group was chartered to implement the findings of a May 1999 DOD report that highlighted deficiencies in our understanding of the effects of low-level exposure to chemical weapons. The working group mission is to ensure a focused, coherent effort is made to redress these deficiencies and thereby provide the basis for a knowledge-based risk assessment and risk-management strategy. The working group will review ongoing research, recommend new research programs, provide guidance on the standardization of models, CW agents, and exposure levels to guide research, and ensure that research efforts address operational considerations.

The Restoration of Operations (RestOps) Advanced Concept Technology Demonstration (ACTD) is an ongoing initiative designed to provide a fixed site with the capability to take effective actions to protect against and immediately react to the consequences of a chemical or biological attack. RestOps aims to enhance site response for quicker recovery of operating tempo through an integrated sensor and early warning network; improved protection, decontamination, and medical response capabilities; and an improved ability to determine the impact of attacks on operations (with emphasis on sortie generation). While expecting rapid restoration to original pre-attack capability would be unrealistic, a significant reduction in degradation and recovery time may be possible through focused improvements in materiel and tactics, techniques, and procedures. A proposed follow-on ACTD would focus on contamination avoidance at sea ports of debarkation in the USCENTCOM area of responsibility beginning in FY02.

Emerging Counterforce Capabilities

The Gulf War exposed serious deficiencies in our ability to locate and target NBC and mobile missile targets. Allied planners significantly underestimated the number, location, and type of Iraqi NBC assets; as a result, many important sites escaped attack and were not discovered until United Nations inspections took place. Moreover, targeting NBC facilities raised an issue with acute political, legal, humanitarian, and operational

implications: the potential for collateral, principally civilian, casualties resulting from the spread of toxic materials. These considerations were still critical 7 years later, when the risk of releasing chemical or biological materials led the United States and United Kingdom to proscribe certain targets during Operation *Desert Fox* in 1998. As Secretary of Defense William Cohen said at the time, "We're not going to take a chance and try to target any facility that would release any kind of horrific damage to innocent people."[17]

Also in 1998, similar considerations reportedly influenced the selection of targets in Operation *Infinite Reach*, in which U.S. cruise missiles struck the al-Shifa facility near Khartoum, Sudan. According to press accounts, this plant was targeted both because of its suspected connection to chemical weapons and because it posed a lesser risk in creating civilian casualties than other nominated targets.[18]

In this area, research and development activities are directed at developing strike capabilities that can achieve operational objectives while minimizing collateral effects and denying sanctuary to adversary assets located in hardened and/or buried targets. The research and development community is emphasizing comprehensive support to the warfighter, from target characterization and pre-attack planning to systems integration and weaponeering to post-attack assessment. Given the significant concern regarding collateral effects, an important counterforce focus is to develop targeting support tools that integrate NBC weapons effects phenomenology and target-specific information on critical nodes and NBC processes in countries of concern. Increasingly, the focus here will be on the biological weapons threat and how best to interdict it. A related technical challenge is to keep pace with adversary efforts to protect NBC assets through hardening and other forms of cover and concealment.

Equally challenging is the problem of locating and targeting critical mobile targets, particularly ballistic missiles. This, too, was a key problem area during the Gulf War. Coalition forces expended considerable resources in a largely unsuccessful effort to find and destroy Iraqi mobile missiles. While the coalition had considerable success targeting fixed sites associated with mobile missile operations and suppressing the overall missile rate of fire, the effort to target the mobile element of Iraqi missile operations was generally ineffective.

As capabilities emerge that provide solutions to these fixed and mobile target problems, U.S. forces may become less constrained in taking offensive action against NBC assets and the adversary's task in seeking to protect these assets will become increasingly difficult. As our ability to credibly hold such targets at risk improves, some of the leverage

associated with possessing NBC weapons will begin to erode. A number of specific areas are of particular interest.

Counterproliferation ACTDs. Surface or shallow buried targets characterized by reinforced concrete bunkers are vulnerable to current or planned penetrating munitions. The Counterproliferation 1 ACTD demonstrated how an advanced penetrating munition with a "smart fuze" delivered from manned aircraft could defeat a cut-and-cover target while limiting the venting of toxic materials. The Counterproliferation 2 ACTD is now testing standoff penetrators to perform a similar mission, integrating more sophisticated sensor tools for combat assessment.

Advanced Energetic Materials provide another potential solution to the challenge of neutralizing NBC hazards with minimal collateral effects. So-called agent defeat munitions require payloads that rely on extreme heat, chemical reaction, or thermobaric effects (fuel-air blast). Several DOD organizations are investigating these concepts, and some are being pursued in collaboration with allied research and development establishments.

Hard and Deeply Buried Targets (HDBT). Hard and deeply buried targets presently are invulnerable to physical destruction by conventional weapons. These targets are multiplying as a result of advances in tunneling technologies and the priority adversaries give to cover, concealment, and deception. As a result, greater management attention and resources are being devoted to HDBT defeat. After many years of technical study, efforts to develop solutions to this problem are transitioning to requirements definition and the creation of a science and technology master plan. Solutions will be built on advances in target characterization and computational tools, the establishment of realistic test facilities, and new concepts to exploit unique vulnerabilities of tunnels for functional defeat. Some in the warfighter and analytic communities have called for modifications to existing nuclear weapons to provide more effective counters to deep underground facilities.

Special Operations Forces (SOF). Counterproliferation is a principal mission of the U.S. Special Operations Command, whose forces may be called upon to perform missions in advance of, or in conjunction with, direct military action. Special operations forces train to carry out interdiction missions, provide reconnaissance to locate NBC or missile assets, and conduct precision strikes to capture, disable, or destroy such assets. Research and development for SOF-related activities addresses critical gaps in operational capability, with an emphasis on HDBT and mobile threat systems as well as NBC detection and explosive ordnance disposal. Developing the capabilities and operational concepts to defeat BW-related facilities is one important area of emphasis.

Hazard Prediction capabilities have received considerable attention since Operation *Desert Storm*. In the context of extensive analysis of the mysterious "Gulf War Syndrome," a number of different models were employed in an effort to discern whether, when, and in what quantities chemical agents may have been dispersed—inadvertently or otherwise—during the Gulf War. The incomplete data and often divergent assumptions upon which purported releases were modeled led to inconsistent, and often contradictory, effects modeling. This uncertainty, and parallel concerns over our limited ability to accurately predict downwind hazards from chemical and biological releases, prompted greater investment in automated systems to simulate NBC hazard transport and diffusion. Further, to better rationalize DOD approaches to this problem, the Deputy Assistant to the Secretary of Defense for Nuclear, Chemical, and Biological Defense has been designated as the central DOD authority on issues relating to NBC modeling and simulation.

Attack Operations focus on fielding improved capabilities against mobile missile threats. The overall goal is to degrade adversary capability to the point where the threat can be neutralized effectively by active and passive defenses. By reducing launch opportunities and forcing the adversary to conduct decentralized operations, attack operations seek to prevent coherent missile attack strategies intended to overwhelm in-place defenses. Current emphasis is on exercises, experiments, and the development of tools and technologies designed to define and achieve required levels of effectiveness to meet this goal. Critical supporting capabilities are in the areas of intelligence, surveillance, and reconnaissance (ISR); battle management and command and control (BM/C^2); and weapons. The principal technical-operational challenge is to detect, identify, and track time-critical targets (in particular, loaded transporter-erector-launchers and populated garrisons) and to pass this information to platforms positioned to conduct timely strikes. This requires responsive, real-time capability to manage multiple sensor assets, fuse large volumes of sensor data, and task weapons platforms. These capabilities are not unique to counter-mobile missile operations. The emerging operational concept, architecture, and joint capabilities roadmap for attack operations builds extensively on current or planned multi-mission systems for ISR, BM/C^2, and weapons.

Active Defense

Many regional states, including past and potential future U.S. adversaries, are investing heavily in the acquisition and/or development of ballistic missiles. The spread of Scud technology, in particular, has fueled

this process. The international community became sensitized to this phenomenon in the Iran-Iraq "war of the cities" in the 1980s. The United States and its allies confronted the missile threat directly during the Gulf War, and the strategic potential of these weapons—despite their substantial inaccuracy—became much more evident. Especially if mated to NBC weapons, ballistic missiles have the potential to shape profoundly the political and military nature of future crises and wars. U.S. missile defense efforts in the 1990s focused largely on countering the regional threat to expeditionary forces. Progress has been made in these programs, though large-scale deployments remain several years away. Regional powers continue to use ballistic missiles to intimidate adversaries and support military operations.

The inexorable extension of missile ranges and the ongoing exchange of technologies among proliferator states mean more nations will be able to move beyond short-range systems (less than 1,000 kilometers [km]) to field medium-range missiles (1,000–3,000 km) over the next several years. At least seven states already have done so, including North Korea, Iran, Pakistan, and India. These four states also have active intermediate-range (3,000–5,500 km) missile programs, and a number of countries have developed or are seeking to develop launch vehicles that could provide the foundation for intercontinental-range missiles. The potential long-range missile threat, especially from rogue states like North Korea, Iran, and Iraq, has been a growing concern of the United States for several years and has heightened the emphasis within the overall missile defense effort on capabilities designed to protect U.S. territory.

A New Approach to Missile Defense

After considerable debate, the Clinton administration decided to pursue a limited homeland defense capability based on a single (land-based) system and sought to conform its characteristics to the constraints of the 1972 Anti-Ballistic Missile (ABM) Treaty. The Bush administration has adopted a different approach, emphasizing a broad program of technology investigation and concept development not constrained by the Treaty and therefore not artificially segmented into theater and national defensive systems. The plan unveiled by administration officials in July 2001 envisions an aggressive program of research, development, testing, and evaluation (RDT&E) focused on key technologies for intercepting all ranges of missiles at all stages of their flight: boost, midcourse, and terminal. The architecture for an end-state missile defense capability has not been predetermined; initial emphasis is on reinvigorating RDT&E activities, speeding development of proven technologies, and identifying the most promising new technologies, including space-based concepts.

Changes to the testing infrastructure are intended to provide for more realistic testing, including the launching of multiple missiles from several different locations in likely flight paths toward the United States.

The administration's goal is to field as soon as possible a limited but effective defense against "handfuls" of missiles. Fielding prototype or rudimentary versions of ground-, sea-, and air-based systems capable against longer-range missiles may be possible by 2005. The test program designed to advance this goal will, according to administration officials, "bump up against" the ABM Treaty sooner rather than later.

The International Dimension. Although unilateral withdrawal from the ABM Treaty is possible, the United States is exploring with Russia the prospect of developing a new framework on missile defenses that can replace the treaty. As a practical matter, no missile defense system currently envisioned by the United States would jeopardize Russia's strategic deterrent. China, while not a party to the ABM Treaty, has expressed strong concerns about U.S. intentions, suggesting that effective missile defenses will both undermine China's strategic posture and compel greater investment in strategic forces. U.S. officials have observed in consultations with Russia and China that both states have contributed to a worsened proliferation environment, particularly vis-à-vis missiles, and to the resulting sense of risk that has created the need for defensive systems to counter advances in rogue state programs.

NATO. Some European states have expressed reservations regarding the U.S. intent to develop and deploy a "national" missile defense, but trans-Atlantic cooperation on a range of other missile defense initiatives is both substantial and longstanding. Several NATO allies participate in the Patriot program, and others are currently engaged with the United States in developing the Medium-range Extended Air Defense System and exploring sea-based missile defense concepts. In fact, NATO consideration of missile defense has, from the outset, been an integral element of the overall Alliance approach to meeting the proliferation threat. The 1994 Brussels Summit established senior-level working groups to develop a policy framework for preventing, reducing, and defending against NBC threats. The Senior Defense Group on Proliferation (DGP) assessed NBC threats to NATO and identified a priority requirement to defend deployed Alliance forces with extended air defenses, including tactical ballistic missile defense. Near-term emphasis was to be placed on lower-tier missile defense, but the DGP also concluded that layered defenses (lower- and upper-tier) would be needed as the missile threat evolved. In addition, the DGP envisioned that wide area defenses could one day be needed to protect NATO territory against longer-range ballistic and cruise missiles.

Based on the DGP findings, NATO civil and military authorities began integrating missile defense into planning through the development of initial operational concepts and requirements.

By the late 1990s, arrangements for shared early warning based on U.S. space-based assets were being implemented, and Alliance members agreed that tactical ballistic missile defense battle management and command, control, and communication functions would be integrated as part of the NATO Air Command and Control System. The 1999 Washington Summit added impetus to these efforts by recognizing the need to improve the Alliance posture against NBC threats. More recently, NATO commissioned two detailed feasibility studies to evaluate alternative architectures for integrating "layered" missile defensive systems into NATO extended air defense. These studies, which are funded by NATO and led by U.S.-Europe industry teams, will by early 2003 recommend a preferred architecture and prepare draft requirements documents. Study results will be used in a subsequent project definition phase to develop more detailed design and operational performance parameters for capabilities to be procured by 2010. This work represents a pivotal step in advancing an overall vision for NATO missile defense as an interoperable family of systems providing layered protection, supported by a foundation of shared early warning and robust battle management and command, control, and communications. Existing national and multilateral programs provide key building blocks for acquiring this capability.

Other States. Several other states allied with or friendly to the United States also are increasingly concerned about the growth in regional missile capabilities and view active defense as a necessary response. Some states, such as Israel, see missile defense as central to their security and have made significant investment in active defense capabilities. The Israeli Arrow system, funded largely by the United States, is now deployed in limited numbers, and research continues on boost phase intercept capabilities. Japan, alarmed by the North Korean missile test in August 1998, responded in part by joining the United States in research and development for sea-based missile defense. Finally, states such as Turkey and Taiwan have recently expressed strong interest in acquiring missile defenses. As the ballistic missile threat grows, additional states also are likely to seek such capabilities.

Cruise Missile Defense. Active defense requirements increasingly will need to extend to cruise missiles. While few states currently possess long-range land-attack cruise missiles (LACMs), many have acquired anti-ship cruise missiles. It is possible, using current aerospace technology, to convert anti-ship cruise missiles or modify other airframes into LACMs,

and the technologies to support cruise missile development are widely available. These include commercial GPS navigation instruments, compact avionics, flight programming software, and powerful, lightweight jet propulsion systems. Outright purchase of LACMs is also possible; in recent years, high-performance cruise missiles have been displayed at Russian air shows.

By 2010, as many as 10 states—some of them in regions of principal security concern to the United States—may possess LACMs. Although ballistic missiles likely will remain a priority (at least in the near term) for many states because of their political and psychological significance, cruise missiles in many ways offer a cheaper and operationally effective alternative or complement to ballistic missiles. For instance, biological agents can be delivered far more efficiently in a line source from a cruise missile than through bulk dissemination from a ballistic missile warhead. The characteristics of cruise missiles, including their small size, ability to operate in low altitude, terrain-following mode, and variable flight paths, present a considerable challenge to the defense. To the degree emerging LACMs have stealth features, this challenge will be even greater.

Cruise missile defenses have been a consistent feature of the CINC priority lists compiled annually since 1994, but to date, only modest investment has been made in developing appropriate capabilities. Higher priorities have commanded greater resources, and management attention has been focused more on the ballistic missile challenge. Today, recognition of the cruise missile problem is growing in DOD, and increased management attention and resources are being devoted to developing solutions. These solutions will build on traditional air defense capabilities, some ballistic missile defense programs (for example, Patriot PAC-3 has demonstrated a capability to intercept cruise missiles), and, perhaps most important, innovative concepts for improved surveillance and networked sensors to address the toughest problem posed by cruise missiles: detecting the target. At present, a number of individual service programs exist, some of which show promise. But DOD is still in the early stages of organizing a more systematic or architectural approach to cruise missile defense. The North American Air Defense Command is developing formal requirements, and the Assistant Secretary of Defense for Command, Control, Communications, and Intelligence has been given lead responsibility to create a long-range technology development and acquisition plan. The initial objective is to determine the degree to which existing capabilities can be leveraged to form the foundation of a cohesive defensive network.

Chapter Six

Responding to the Biological Warfare Challenge

Over the last two decades, biological warfare capabilities have proliferated both horizontally and vertically. The number of nations pursuing biological weapons has grown, though in recent years, the increased sophistication of existing capabilities has been of relatively greater concern.[19] Motivations may vary, but these trends are facilitated by at least three factors: inherent limitations in nonproliferation and arms control regimes; the potential diffusion of materials and know-how from countries such as Russia and South Africa; and advances in biotechnology. Especially as the capabilities of potential military adversaries grow, so does the importance of the United States finding effective responses to this threat. If the United States confronts a significant BW threat in the future and fails to deal with it effectively, the appeal of biological weapons likely will grow, and states that had opted to forego these weapons could well reconsider their choice. While DOD today views the activities of a select number of states as a matter of concern (table 3), a world in which 30 or 40 or more states possess biological weapons would be a world in which the U.S. role in projecting power and underwriting regional security in key regions would be incalculably more difficult.

Yet in the decade since the Gulf War, we have made only limited progress in meeting the BW challenge—despite considerable motivation, resources, and effort. On one level, the more we have learned about biological weapons, the more complex the challenge has become. On another level, solutions we thought could be fielded relatively quickly have proven more difficult than anticipated. Our response has been hampered as well by deficiencies in expertise, organizational dysfunctions, regulatory requirements, and "legacy" or "business-as-usual" mindsets (for example, over-reliance on inadequate technical detection or intelligence capabilities). Fundamentally, despite the insights and capabilities gained in the last 10 years, the counterproliferation community still does not have an appropriate and shared vision for defense against biological weapons or a

widely accepted understanding of what constitutes success in an expansive threat environment. Today, many defense elements continue to view biological defense through the chemical defense prism—despite considerable differences in weapon employment, casualty generation, net operational impact, and the requirements for and efficacy of medical countermeasures.

One reason for our limited progress over the past decade is that the BW threat has not been *universally* viewed as the most urgent of security challenges. Whereas many observers see a unique convergence of motivations and technologies rendering the threat increasingly salient, others see the apparent absence of BW use in modern conflict as evidence of restraint by states that is likely to carry forward into the future. (This viewpoint and related judgments may need to be revisited in light of the September 2001 anthrax attacks. As of this writing, it is not yet known who is culpable for these actions.) For still others, the threat is so great that traditional countermeasures are likely to produce only marginal reductions in risk, and at high cost. They argue that investment is better directed elsewhere, and nuclear deterrence is the only viable response. Finally, there are those who see the urgency of the threat but view the solution in simplistic terms—particularly better intelligence or a technology breakthrough. The reality is far more complex. Although more intelligence can always be acquired, a "smoking gun" on capabilities will remain difficult to uncover, while reliable, real-time information on adversary intentions is an even harder target. (Indeed, the Intelligence Community cannot obtain information that the adversary has yet to develop and integrate; those climbing the BW "learning curve" may in some cases be doing just that: learning as they go.) Dramatic technological breakthroughs are always possible, but there is no "silver bullet" on the horizon that will dramatically transform the BW defense problem. In any case, technology innovation alone is not likely to relieve the CINCs and services of the requirement to rethink the warfight in the context of adversary BW employment.

Without a shift in attitude and approach, the growing dynamism of the BW threat may well outstrip U.S. ability to mount a meaningful response. If we are to see real progress, senior-level commitment is required. In the past, Presidential initiative has been a catalyst for greater action, as in bioterrorism response. Sustaining Presidential commitment is critically important, especially at a time of transition in defense strategy and in light of the interagency nature of the BW problem. Within DOD, the Secretary of Defense and his senior team must translate the general discussion of emerging threats into focused attention on the BW problem. This means ensuring adequate funding to sustain a coherent long-term biodefense strategy and implementing the reforms necessary to leverage those resources to field meaningful capabilities.

Table 3: Assessment of Select BW Proliferators (2001)[20]

Russia	Some elements of the Soviet-era biological warfare program may remain intact and could support future agent production. Some offensive biological warfare activities may be ongoing.
China	Possesses an advanced biotechnology infrastructure as well as the requisite production capabilities to develop, produce, and weaponize biological agents. Reaffirmed its commitment not to develop biological weapons but likely retains some elements of an offensive program.
North Korea	Has pursued biological warfare capabilities since the 1960s. Possesses infrastructure that can be used to produce biological warfare agents; may have biological weapons available for use. Thought to be working with anthrax, cholera, plague, and smallpox pathogens.
India	Has substantial biotechnical infrastructure and expertise, some of which is being used for biological warfare defense research.
Pakistan	Believed to have the capabilities to support a limited biological warfare research effort.
Iran	Possesses overall infrastructure and expertise to support a biological warfare program. Pursues contacts with Russian entities and other sources to acquire dual-use equipment and technology. Believed to be actively pursuing offensive BW capabilities; may have small quantities of useable agent now.
Iraq	Produced and weaponized significant quantities of biological warfare agents prior to 1991, including anthrax, botulinum toxin, and aflatoxin. Admitted its biological warfare effort in 1995 after 4 years of denial; claims to have destroyed BW munitions stockpiles after the end of the Persian Gulf War. Believed to be able to reconstitute its BW capabilities within a few weeks or months in the absence of inspections; may have restarted its BW program already.
Syria	Has a limited biotechnology infrastructure, but thought to be adequate to support a limited BW program. Believed to be pursuing biological agent development but no major agent production effort likely is under way.
Libya	Remains in research and development stage but may be capable of producing small quantities of agent. Hindered by a small technological base and UN-imposed sanctions.

In particular, streamlining the research, development, and acquisition activity for biodefense should be a priority. Organization and process in this area are by most accounts unnecessarily complicated, with unclear lines of authority and inadequate oversight to ensure the effective collaboration of developers, warfighters, and the defense medical system. Among the management reforms that should be considered are strengthening the oversight role of the Office of the Assistant to the Secretary of Defense for Nuclear, Chemical, and Biological Defense and establishing a Joint Program Executive Office for BW defense. Taking stock of current efforts to develop state-of-the-art biological detectors may also be advisable. While this activity has yielded important progress over the last decade, solving the technical detection problem clearly is proving far more difficult than anticipated. An end-state of "detect to protect" or "detect to warn" remains a sound objective, but predicting with confidence when such a capability will be achieved is difficult. In addition, it makes sense to hedge against the possibility that a "detect to protect" capability is not achieved in a reasonable timeframe. Moreover, in the event such a capability does become available, the number of systems acquired may not be sufficient to ensure full force protection in the near- to mid-term. All these uncertainties suggest the need to consider different approaches to technical detection—including non-traditional concepts, which could involve complementing achievable advances in technical detection with operational concepts emphasizing epidemiological surveillance, meteorological monitoring, and expedient masking in high-threat conditions.

The warfighter community needs better tools to analyze the operational impact of biological weapons. In turn, this community needs to develop actionable biodefense concepts, integrate them into planning, and conduct realistic exercises and training. The trend to date has been to downplay the potential magnitude of the BW challenge or overestimate the efficacy of U.S. countermeasures in exercises and training in several ways: by specifying implausible or ineffective offensive employment conditions or delivery modes, selecting agents that would not be show-stoppers or whose effects would not truly be felt until well after the brief exercise, or choosing agents for which we assume (correctly or not) adequate prophylaxis and, thus, little operational impact.

Chapter Seven

Medical Dimensions of Counterproliferation

The NBC medical defense community faces complex challenges. Medical planners confront significant uncertainties in thinking through how threats will materialize and how decisions affecting our response will be made. The element of the unknown is particularly acute with respect to the biological warfare threat, which can present itself in many different ways, some with the potential for creating mass military and civilian casualties that would quickly overwhelm medical systems. This large military-civilian overlap is just one factor contributing to the complexity of NBC medical defense efforts. Another is the fact that medical planning and responses can be dramatically affected by policy decisions that may not be made until a conflict is already under way or an NBC event has already occurred. Nor is it clear that NBC medical defense is adequately integrated into the deliberate planning process, both in Washington and in the field at home and overseas. Against this backdrop, a number of specific issues affecting threat and response require attention.

Addressing All Aspects of the Threat

The annual Chairman of the Joint Chiefs of Staff validated BW threat list is used for planning and resource allocation, but it alone cannot—and does not—capture the complexity of the threat.[21] If not all threats are of equal concern, how do we prioritize known risks and assign limited resources? A more systematic medical risk analysis, such as that recently undertaken by the Army Office of the Surgeon General, may provide an improved guide to planning.[22] This analysis attempts to assess the relative importance of particular biological agents from a medical standpoint. Future medical risk analyses should build on this initial effort, also evaluating the potential for modification (for example, antibiotic resistance) or genetic engineering of agents, even if such threats today may be considered non-evidentiary. Additionally, the medical defense community cannot discount non-traditional diseases that could have potential security implications.

Current law stipulates that no more than 20 percent of funding for medical countermeasures may be obligated or expended for research, development, testing, and evaluation against threats outside the list of near-term (within 5 years) "validated biowarfare agents." Consequently, relatively few resources are devoted to agents considered to pose risks in the mid- or far-term (5–10 and 10–20 years, respectively). Establishing an appropriate balance in our investment strategy between current and emergent threats is clearly difficult. The timely development of required products is certainly essential, but so is basic science and research intended to improve long-term understanding of biological processes. Deep research of this type is the foundation for new knowledge that will provide solutions to future threats not yet in our field of view. Especially if we expect the defense to lag offensive BW efforts, we cannot afford to devote all our energies to problems identified long ago while ignoring potentially significant advances in biotechnology that may yield new threats with the potential to alter fundamentally the character of the BW problem.

Challenges to Effective Countermeasures

In theory, an effective vaccine has tremendous value because it can eliminate what an adversary may consider a high-leverage threat. For this reason, DOD is investing in capabilities to develop, test, license, produce, and field a range of new vaccines. But this process is complicated, lengthy, and costly. Vaccines are available for only a limited number of threat agents, and most are in the category of investigational new drugs (IND), meaning they have yet to complete the full Food and Drug Administration (FDA) approval process. Although DOD previously operated under the assumption that, given the magnitude of the potential threat to personnel, the use of INDs would not be a problem in wartime, experiences with "Gulf War Syndrome" and the anthrax vaccine have changed the political landscape considerably.

To what degree is the regulatory process itself a problem in fielding countermeasures? To some observers, the lag in approving treatments and vaccines indicates that the FDA does not share the DOD sense of urgency in countering the chemical and biological threat. One result is that the already-limited commercial interest in manufacturing vaccines is further reduced. To others, the regulatory process managed by the FDA is absolutely vital as an independent benchmark of quality and safety and is not fundamentally broken. While accelerating the regulatory process for approving treatment or vaccines for biological agents of acute concern may provide an answer in some cases, such an approach is unlikely to present a permanent solution.

Table 4: Medical NBC Programs and Modernization Strategy[23]

	NEAR (FY00–01)	MID (FY02–05)	FAR (FY06–16)
Medical Chemical Defense	Licensed topical skin protectant	Licensed advanced anticonvulsant Licensed multichambered autoinjector	Licensed reactive topical skin protectant Licensed advanced prophylaxis for chemical warfare agents Licensed specific protection and treatment for blister agents (vesicant agent countermeasures) Licensed ophthalmic ointment for vesicant injury Licensed therapeutic lotion for burns caused by vesicant agents Licensed vesicant agent prophylaxis
Medical Biological Defense	Anthrax vaccine amendment for new dosing schedule	Licensed Q fever vaccine Licensed smallpox (vaccinia virus, cell culture-derived) vaccine	Licensed next generation anthrax vaccine Licensed new plague vaccine Licensed new Venezuelan Equine Encephalomyelitis (VEE) vaccine Licensed multivalent equine encephalitis (VEE/western equine encephalitis/eastern equine encephalitis) vaccine Multiagent vaccine delivery system Portable Common Diagnostic System Licensed multivalent (A, B, C, E, and F) Botulinum vaccine Licensed ricin vaccine Licensed tularemia vaccine Licensed brucellosis vaccine Licensed multivalent staphylococcal enterotoxin vaccine
Medical Nuclear Defense	Broad spectrum, nontoxic androstene steroid protectant validated Combination cytokine therapy validated	Slow-release subcutaneous implants for sustained delivery of radioprotectants New-generation prophylactic and therapeutic immunomodulators for multiorgan injuries	Licensed radiation-induced cancer/mutation preventive techniques Licensed countermeasures for chem-bio-radiation interaction Echelon 2 biodosimetry system

	Risk assessment for low dose, low dose-rate radiation effect Biodosimetry assessment tool software program	Computer models to understand effects resulting from combined NBC attacks Echelon 3 bio-dosimetry system	

Other fast-track policies imposed on the FDA have had mixed results, leading in some cases to major drug recalls. One problem is resources: the FDA is underfunded and understaffed and is often unable to effectively and rapidly exploit new technologies. Another limitation is the availability of data: without rigorous testing, it is difficult to "push the envelope" on vaccine development. As a result, most DOD funding associated with vaccine development is now directed toward testing to ensure that no unwanted side effects exist—a process that, over time, may prove cost-prohibitive for DOD. Regardless of cost, if a "no-risk" requirement takes hold, vaccination as a biodefense strategy will become increasingly problematic.

DOD vaccine developers are underfunded as well. Private industry estimates that the average cost of bringing a *single* vaccine successfully through the licensing process is over $400 million. The annual budget of the U.S. Army Medical Research Institute for Infectious Diseases is just 10 percent of that amount. Although an ambitious plan is in place to license a number of vaccines in the 2005–2015 timeframe (table 4), many question the prospects for success under current funding profiles. The need for greater integration or leveraging of government-wide capabilities related to medical countermeasures is pressing. Substantial resources and relevant expertise exist in other Federal agencies, such as the National Institutes of Health and the Centers for Disease Control and Prevention—both of which have in recent years taken an active interest in issues relating to bioterrorism preparedness.

Assumptions about the efficacy of antibiotic treatment also should be challenged. Naturally occurring antibiotic resistance is increasingly common. Indeed, some organisms are now treatable with only a single therapy, rather than the multiple prophylactic options previously available to physicians. This feature should be of central concern for biodefense. Producing organisms resistant to a single antibiotic protocol is relatively easy. For instance, ciprofloxacin was selected as an antimicrobial of choice a decade ago in part because there was no known natural resistance

to it. That is no longer the case. Soviet scientists attempted—and failed—to produce biological agents resistant to up to 10 antibiotics. However, according to defectors from that program, they did succeed in producing pathogens resistant to as many as five. Assuming that other countries are not trying to do the same would be dangerous—especially with advances in biotechnology that may make the job easier in the years to come.

Nor are the identified medical, policy, research, and resource issues limited to the BW arena. Exposure to novel chemical agents, for instance, is likely to be fatal unless personnel are pretreated, perhaps with pyridostigmine bromide (PB), a drug whose effectiveness is well modeled in animals but is still considered experimental in humans. Because PB is an IND yet to be licensed by the FDA as a pretreatment for chemical warfare agents, it has encountered resistance in the warfighter community. The President can waive the required "informed consent" provisions of law under extraordinary circumstances, but this requires a detailed, 18-step process that probably would not be accomplished quickly. Similarly, while antibiotics may help mitigate or forestall the effects of some biological agents, DOD pre-exposure application of certain prophylaxes would encounter difficult legal constraints, and robust post-exposure treatment could, absent appropriate planning, encounter significant logistical, financial, or other operational difficulties. Yet without greater progress on medical countermeasures, the military may encounter future situations in which the use of INDs is the preferred, if not only viable, course of action. The potential need to use investigational drugs in the field raises major policy, operational, and ethical issues that will need to be considered in deliberations concerning the prepositioning of medical countermeasures and the treatment of noncombatants, U.S. and coalition forces, and host-nation support personnel.

Vaccine Production

The current debate over how to produce vaccines underscores the challenges associated with creating a sustained, systematic response to the NBC threat. It also reveals some of the complexities related to the role of the private sector in mobilizing national capabilities for this mission. Many argue for a government-owned, contractor-operated (GOCO) vaccine manufacturing facility, principally on the grounds that this is the only practical approach. Only four significant commercial vaccine producers still exist, and all have in the past expressed skepticism with respect to the business. Pharmaceutical companies are simply not interested in producing particular vaccines because the profits are low while the risks are high.

Recent problems with the availability of tetanus and influenza vaccines underscore the trend. Especially for vaccines likely to require only limited production quantities (1–2 million doses per year), the economics are prohibitively unattractive. Today, only two vaccines are slated for production in volumes sufficient to be commercially viable: anthrax and smallpox. Department of Defense ownership of vaccine manufacturing may not be optimal, but reviving commercial interest has traditionally proven difficult. This issue is likely to evolve further in light of the September 2001 anthrax attacks in the continental United States.

Those arguing against a GOCO facility point to the widespread skepticism likely to accompany a DOD-produced vaccine, compared to the product of a reputable pharmaceutical company. Moreover, vaccine production is a highly complex, specialized process, and DOD may not have the expertise to manage such a program. Critics of the GOCO facility suggest that the private sector concerns can be addressed through the proper financial and legal incentives—and through appeals to the national interest (which may require a dose of Presidential persuasion). If the combination of profit and patriotism can overcome private sector resistance, the payoff could be substantial in terms of efficiencies and of maintaining a dispersed base of national expertise in a very complex set of skills and processes. This could have a positive impact on the creation and sharing of future knowledge.

Building DOD Expertise, Capabilities, and Procedures

The Defense Department lags in several areas critical to a fully responsive NBC medical defense capability. Overall, the medical defense system needs to better integrate NBC considerations at both the national and local levels. This coordination is beginning to occur, but voids remain in policies and procedures (especially at the level of the local military base or hospital) regarding coordination with and outreach to civilian authorities and the local public health system. Expertise in dealing with biological warfare agents is lacking, which hampers efforts to establish robust diagnostic capabilities. Training programs are being developed to remedy this, focused in part on incorporating into military medicine polymerase chain reaction techniques and preparing personnel for more advanced diagnostic tools that may be available in a few years. Improving the working level of knowledge of microbiology is critical to enhanced diagnostic capabilities and could be aided by a library of microbe sequences. Such an archive would help in the development of procedures for making definitive diagnoses. Finally, more attention is being given to medical surveillance systems that can, based on careful reporting and other techniques,

facilitate timely detection and diagnosis of biological warfare events. Improved early warning of a biological attack and enhanced mass-casualty treatment procedures and capabilities are urgent requirements.

Chapter Eight

Deterring NBC Use

Today's world requires a new policy, a broad strategy of active nonproliferation, counterproliferation, and defenses. We must work together with like-minded nations to deny weapons of terror from those seeking to acquire them. We must work with allies and friends who wish to join with us to defend against the harm they can inflict. And together we must deter anyone who would contemplate their use.

We need new concepts of deterrence that rely on both offensive and defensive forces. Deterrence can no longer be based solely on the threat of nuclear retaliation. Defenses can strengthen deterrence by reducing the incentives for proliferation. . . . We need a new framework that allows us to build missile defenses to counter the different threats of today's world.
—George W. Bush[24]

The decade since the end of the Cold War has passed without a fundamental U.S. reassessment of the nature of and prospects for deterrence. In 1994 and again in 1997, the Clinton administration issued revised guidance on the role of nuclear weapons in U.S. national security policy, but little systematic thought has been devoted to examining the continuing relevance of Cold War-era deterrence concepts. Today, that reassessment has begun, driven by new strategic realities and new capabilities but based on enduring principles. Applying those principles to the risks and opportunities present and emerging in the security environment is one of the central challenges facing U.S. national security and defense planning.

New thinking about deterrence proceeds from a key historical consideration: as horrifying as the Cold War "balance of terror" was, it contributed to preventing not only nuclear war but also a major conventional conflict between superpowers. This success was grounded in a degree of mutual understanding and shared interest between the United States and Soviet Union. Each side believed that it understood the others' values, decisionmaking processes, and likely behavior under given circumstances. Both sides were somewhat cautious and often averse to high-risk behavior, understood the costs of deterrence failure, and sought to establish rules to regulate competition and contain the risks inherent in the posses-

sion of large, sophisticated nuclear arsenals. Fundamentally, both sides accepted mutual vulnerability—which became characterized as mutual assured destruction (MAD)—as the imperfect but indispensable instrument of stability.

The changed character of the post-Cold War world has raised serious doubts about the continued relevance of this model. Some believe that mutual vulnerability, whatever its flaws, remains the *sine qua non* of strategic stability between the United States and Russia and presumably China as well. Others believe that mutual vulnerability is the wrong principle on which to base strategic relations. New technology reinforces the challenge to MAD doctrine, enabling both the U.S. commitment to missile defense and research into non-nuclear weapons with the promise of achieving strategic effects without mass destruction. Framing a new concept for deterrence around these propositions and possibilities has significant implications for nuclear forces, defense investment, arms control, and allied relations. Some complex issues need to be confronted. How will the advent of defenses and non-nuclear strategic weapons affect nuclear forces? Do we envision cooperative defenses? Should we continue to maintain a large operational nuclear plan directed at Russia? Should we accept a relationship of mutual vulnerability with China, or should the United States seek to deny Beijing coercive options by deploying missile defenses?

Questions of these kind have no easy answers, in part because they are politically dynamic, in part because no simple formula can define future offense-defense relationships. While we need to conceptualize the respective roles of offensive and defensive forces and understand the implications for near-term decisions and longer-term planning, no single, compelling logic is likely to define a future path. Rather, competing visions probably will shape a range of potentially divergent choices. The illustrative configurations in table 5 frame a number of these options, each driven by certain assumptions and carrying certain implications, which have been discussed in recent years.

Options with no national missile defense have variously considered: (a) the status quo at Strategic Arms Reduction Talks (START) II force levels; (b) a Russian proposal for 1,500 strategic warheads and no additional defenses beyond those allowed by the ABM Treaty (under which the United States does not currently deploy a national system); and (c) a radically lower number of deployed strategic nuclear forces than currently envisioned. The very light defensive system (d) reflects the Clinton administration expanded "Capability 1" configuration (a small-scale, ground-based national system) coupled with the offensive force levels envisioned at the time for START III. The light approach (e) reflects that administration's "Capability 3" configuration (capable of defending

Table 5: Illustrative U.S. Force Mixes for 2020[25]

Strategic Nuclear Forces (level of warheads)	0 None	100 Very Light	250 Light	600–800 Medium	1,000+ Heavy
Heavy (3,000–3,500+)	**a**				
Medium (2,000–2,500)		**d**			**g**
Light (1,500)	**b**		**e**		
Very Light (1,000)				**f**	
Minimal (300–500)	**c**				**h**

"National" Missile Defense (number of interceptors)

against a few tens of warheads with penetration aids launched from either North Korea or the Middle East) coupled with the Russian proposal for 1,500 strategic nuclear weapons. The medium defense option (f) would involve missile defenses at levels reminiscent of 1992-era proposals for Global Protection Against Limited Strikes, together with smaller future strategic forces. The heavy options would maintain envisioned START III levels and a robust national system (g), or move toward defense-dominance with robust missile defenses and limited strategic nuclear forces (h). While the Bush administration's missile defense architecture has not yet been publically defined, the President has announced that the United States will reduce its operationally deployed strategic nuclear warheads to a level between 1,700 and 2,200 over the next decade.

In confronting the challenge of developing a viable framework for deterrence of regional NBC threats, the Cold War theory and practice of deterrence is likely to prove of limited use. The structural conditions of the contemporary threat environment are fundamentally different and in many ways more challenging. First, the goals of deterrence have changed. In Cold War Europe, the United States and NATO sought to deter Warsaw

Pact conventional power projection through the threat of nuclear escalation. Today, potential regional adversaries view NBC weapons as viable means to counter U.S. power projection; our goal is to deter the threat or use of such weapons and thereby retain conventional force superiority and sufficient political will to prevail. Looking ahead, will regional NBC powers attempt to deter U.S. military action using essentially the same strategy employed successfully by NATO against the Warsaw Pact—that is, by attempting to raise prohibitively the cost of military action? The answer turns on U.S. willingness to accept risks and, if necessary, to absorb costs. Much will depend on our stake in the conflict.

This uncertainty points to the second basic change in the dynamics of deterrence: the stakes in regional conflicts involving NBC weapons may well be asymmetrical. An adversary with higher stakes than the United States has is more likely to run greater risks and absorb higher costs in challenging the United States through NBC escalation. Particularly if the conflict jeopardizes the adversary's regime or survival as a nation-state, deterring its NBC use through even the most dire threats could prove difficult. In such cases, whether the U.S. interest will be viewed as warranting escalation to the highest levels of violence is unclear. On the other hand, some analysts have argued that the use or even presence of adversary NBC weapons in regional confrontations will raise profoundly the stakes for the United States, given the implications for global order of failing to decisively defeat NBC-armed aggressors. This may be true, and it is certainly in the U.S. interest—and the interests of deterrence—for potential adversaries to believe it. But even where the U.S. stake is (for whatever reason) sufficiently high to lead us to accept the costs of defeating the adversary, making this fact unambiguously clear will be a challenge given evident uncertainties in communicating with potential regional antagonists.

The third important way in which deterrence is different is in our relative lack of familiarity with the particular actors we aim to deter. Absent a sound working knowledge of the adversary, only a limited basis exists for anticipating with any accuracy his responses to deterrent threats. Where there is major uncertainty regarding specific leaders, values, and modes of decision, crafting and communicating deterrence messages is an unpredictable process. History suggests that we can expect to encounter regimes and individual leaders whose values differ from our own, in some cases dramatically so. Without a framework for understanding their motivations, values, and risk calculus, deterrence may be a problematic strategy against such actors, especially if we emphasize imposing costs they may be willing to absorb. This inclination to accept risk does not make

them irrational but rather suggests we lack the means to properly understand them.

The principal implication of these changes is that we should prepare for deterrence failures. Failure is certainly not inevitable, but we should not place high confidence in deterrence strategies if we have limited or uncertain understanding of how to dissuade specific actors from certain actions under particular conditions. Enhancing the prospects for successful deterrence will depend on knowing more about potential adversaries and maintaining a flexible spectrum of capabilities that can be tailored to specific situations. In particular, capabilities that visibly reduce U.S. costs and raise adversary costs should be emphasized. Reducing our own costs—through such means as active and passive defenses—will enhance our freedom of action in regional crises, make our threats more credible, reinforce our will to prevail, and hedge against the failure of deterrence. Raising adversary costs—perhaps, for instance, by fielding weapons that can deny the sanctuary currently provided by hardened and deeply buried facilities—may not in all cases be decisive in tipping the scales toward deterrence success but is likely to be an important contributing factor.

Capabilities that alter the adversary's perception of the benefits and costs of brandishing or using NBC weapons also have the potential to contribute to dissuasion. They may lead proliferators to reconsider their investment in NBC weapons or to channel that investment in more complex and costly directions to avoid or attempt to counter emerging U.S. offensive or defensive capabilities. For this reason, U.S. counterproliferation strategy should include a prominent role for the kinds of science and technology, research and development, and advanced concepts that will allow us to keep pace with or stay ahead of the evolving asymmetric threat. The resulting capabilities will be necessary for dissuasion and deterrence and for prevailing at acceptable cost should deterrence fail.

Chapter Nine

Preemption in Peacetime, Crisis, and War

Preemption of NBC-related targets remains a controversial subject, in part because of the political and legal issues it raises but also because it presents some very difficult operational challenges. But as proliferation problems become more acute, preemption is likely to be discussed more openly, scrutinized more closely, and planned for more deliberately. The potential of biological and nuclear weapons in particular to create mass casualties will, in a crisis (if not before), inevitably compel consideration of preemptive measures that might foreclose such an outcome. Views on the wisdom and feasibility of preemption strategies vary widely and need to be aired more fully if a useful debate is to occur. Such a debate needs to consider at least three fundamental questions: What kind of options might the national command authorities (NCA) require? What judgments need to be made by the NCA in considering preemption? And what are the policy implications of preemption strategies?

In the counterproliferation context, preemption would involve the use of force to disable or destroy adversary NBC weapons before they could be used. In peacetime, the focus likely would be on the adversary capacity to develop and deploy NBC weapons, while in crisis or war the focus would be on operational capability (though infrastructure presumably would be targeted as well). From the standpoint of international law, the central issue relates to the circumstances under which preemption can be considered a legitimate act of self-defense. More restrictive readings of international law would allow a nation to destroy NBC capabilities only after attack. More expansive interpretations would permit a state targeted by another to employ military force to protect itself against imminent attacks, where the prospects for non-violent resolution are remote.

From this perspective, peacetime preemption, absent conditions of imminent attack, could be problematic from the standpoint of international law. But ruling out peacetime preemption as a policy option for this reason seems equally unconvincing; international law is not a suicide pact.

The "imminent attack" legal standard must be leavened by practical considerations that reflect the right of states to self-preservation. One way to do this is to apply the standard of "sufficient threat," under which a military first strike is legitimate if there is a manifest intent to injure, a degree of active preparation that makes that intent a positive danger, and a general situation in which waiting or inaction would greatly magnify the risk. While this standard still offers a very robust set of criteria for preemptive action, it recognizes the real-world circumstances under which nations hostile to one another weigh their vital interests and policy options.

Legal considerations aside, the absence of an imminent threat of attack is likely to make preemption politically controversial. Risks include the likelihood of international condemnation, the possibility of retaliation (including with NBC weapons if the attack is less than completely successful), the possibility of triggering war, and the potential for collateral damage to civilians. These risks need to be weighed against the potential short- and long-term gains for regional stability, achievement of U.S. security objectives, and nonproliferation. In some cases, it may become possible to build a consensus in support of preemptive or involuntary disarmament measures as means to enforce the international nonproliferation regime and norms against the use of NBC weapons, directed principally at rogue states and others whose behavior violates widely agreed-upon international standards. This rationale for peacetime preemption concedes that for these states deterrence of NBC use may fail, and that waiting for a crisis to emerge only gives the adversary more time to develop and to protect his capabilities. Developing a political consensus along these lines would be difficult as long as NBC weapons are not openly brandished or employed but could become much easier if a rogue NBC attack causes major damage or has significant strategic impact.

In a crisis, preemption is likely to be less problematic legally and politically, though more difficult operationally, especially if the adversary enhances protection of or disperses his assets. In wartime, the destruction of hostile NBC weapons is likely to be a high-priority military mission. Legal and political constraints would be even less salient, though the operational challenges would be significant. In either crisis or war, there is a risk of creating "use or lose" pressures that could lead the adversary to employ NBC weapons earlier in the conflict or in ways different than intended.

In situations short of war, several critical judgments will influence NCA consideration of preemption: our ability to deter adversary use of NBC weapons; the likelihood of the adversary transferring NBC capabilities to other states or nonstate actors; the coercive and military utility of adversary NBC capabilities; the existence of credible non-military policy

options; legal and ethical factors; the likely costs and risks of either preempting or not preempting; and the degree of confidence in preemptive military solutions.

In this calculus, the operational challenges to effective preemption have the potential to be showstoppers. Preemption is in many ways a unique mission, requiring an exceptionally high degree of confidence in success. The consequences of failure could be quite severe, and there may be only one opportunity to achieve the specified objective. The intelligence challenge alone is daunting: mission planning would depend highly on a large amount of analytically based intelligence, including engineering analysis to support characterization of a complex target set. Even in peacetime, planners realistically can expect key targets to be dispersed, hardened, or otherwise concealed. In critical ways, intelligence is the "long pole" in planning for preemption. Without improvement to intelligence capabilities, some preemption options simply may not be feasible. Some progress has been made in this and other mission-essential areas such as planning tools, munitions tailored to NBC targets, damage assessment models, operational concepts, and tactics.

> *Since you cannot defend everywhere at all times against every conceivable terrorist tactic, you have no choice, but in your own self-defense, to be preemptive, to go after the terrorists where they are.*
>
> *—Donald Rumsfeld* [26]

Responsible planning requires that the NCA have options for the full range of NBC attack options suitable for peacetime, crisis, and war. The information requirements for timely, informed decisionmaking should be identified, and possible courses of action should be developed and exercised. Senior policymakers need to think through how the development of preemption options could or should affect U.S. declaratory policy. Options range from retaining the current policy of deliberate ambiguity to openly threatening preemptive action against adversaries that acquire or deploy NBC capabilities, with median postures in which the United States declares the right to preempt under certain conditions. The merits of alternative declaratory policies need to be examined, not least for their potential impact on U.S. nuclear doctrine, specifically, whether promoting or adopting a doctrine of preemption could serve to reduce the flexibility inherent in current U.S. nuclear policy. Finally, preemption will be a more viable option if we are viewed as actively supporting and strengthening existing international norms against NBC acquisition and use. Enforcing these norms by force is unlikely to garner widespread international support if we are perceived as indifferent to other forms of prevention.

Chapter Ten

Counterproliferation Past and Future: Key Considerations

Over the last decade, the counterproliferation enterprise has passed through a number of distinct phases. The early phase (1991–94) emphasized consciousness-raising based on *Desert Storm* lessons learned, the establishment of the Defense Counterproliferation Initiative, and an initial effort to find and fix obvious capability deficiencies. The second phase (1995–96) saw the first institutional responses to the counterproliferation challenge: engagement by the policy community (evident in publications such as *Proliferation: Threat and Response*), the joint planning community (for example, through Joint Strategic Capabilities Plan tasking, Counterproliferation Charter, Chairman of the Joint Chiefs of Staff Roles and Missions Study), and the programmatic community (for example, the Counterproliferation Program Review Committee). The third phase (1997–present) has been characterized by the increased engagement of the warfighter community (CINCs and services) in assessing and adjusting to NBC threats. This process has been facilitated by rigorous analytic efforts that have yielded insights allowing the warfighter to understand NBC threats in operational detail. The dominant focus of this phase has been on the chemical warfare threat, and we see today the emergence of evolutionary, risk-based concepts intended to enhance the military's ability to operate within that threat environment. More recently, we have begun to give more systematic attention to the BW threat and to the requirements for consequence management. Revised joint warfighting doctrine has also been developed, encompassing some significant changes in how commanders should plan for operations in NBC environments.

Moving forward, the basic imperative is to sustain institutional focus on counterproliferation so the conditions for further progress can be maintained—both in areas where some success has already been achieved and in areas where an agenda for action remains to be fully defined. As we do so, we need to keep in mind a number of important considerations grounded in lessons learned over the past decade:

1. Counterproliferation is, to a significant extent, the price of engagement. If the United States is to maintain its role as security guarantor, preferred partner, and power projector, counterproliferation must be a central concern. If we allow ourselves to be deterred or defeated by NBC threats from regional powers or terrorists, the strategic, political, and psychological price will be high indeed. If chemical and biological weapons use is a likely condition of future warfare, then counterproliferation must be a principal and sustained feature of defense planning.

2. Our appreciation of the NBC threat has become more sophisticated in recent years, but critical gaps remain in our understanding of how, under what circumstances, and for what specific purposes particular adversaries may use these weapons. The intelligence and science and technology communities face a challenge of growing complexity as the proliferation landscape becomes more dynamic with respect to both motivations and means. The risk of proliferation surprise is increasing; our responses should seek both to diminish the likelihood of surprise and to lessen the consequences of surprise as it occurs.

3. Strategic policy issues have the potential to be transformed by the regional proliferation threat. Active defenses to address the regional long-range missile threat have major implications for great power strategic relations, as do theater systems with respect to coalition cohesion in key regions. Compared to Cold War-era deterrence, deterrence of regional NBC actors will be less predictable and more likely to fail. The potential of large-scale casualties suggests the need for more open consideration of NBC preemption as a policy option.

4. While counterproliferation is increasingly accepted as a necessary defense planning priority, parts of the defense and national security communities still lack awareness of its implications—particularly with respect to the potential operational impact of NBC use. Warfighters have made progress in recent years in understanding the implications of chemical weapons use for critical U.S. military operations and, to a lesser extent, coalition warfare and host-nation considerations. Additional testing, concept development, and

operational exercises and training should further enhance warfighter ability to wage war in a chemical environment.

5. By contrast, only limited progress has been made in the last decade in meeting the biological warfare challenge, despite considerable motivation, resources, and effort devoted to this task. Some insights have been gained into the BW threat, and some improved capability has been fielded. But incremental improvements to biodefense based on traditional concepts may not keep pace with the threat. In turn, there is a danger that biodefense will continue to be seen by many as "too hard." DOD should seek to:

- translate the growing generalized concern about the BW threat into a coherent, actionable vision for the intelligence, policy, and operational communities
- develop an achievable, properly resourced biodefense strategy as a matter of priority, articulated and overseen by senior leaders (this should also receive greater national-level priority)
- consider new concepts for biodefense that are less reliant on the chemical defense paradigm and that complement the current focus on technical detection with greater emphasis on meteorological forecasting, disease surveillance, and expedient masking in high-risk conditions
- conduct more systematic medical risk analysis to improve medical readiness and better target resources for the most likely and most consequential BW contingencies
- train and exercise against realistic BW scenarios, in conjunction with key friends and allies where possible
- develop and implement policies and operational concepts for medical response to mass-casualty and contagious disease scenarios
- reform biodefense acquisition by streamlining research and development and procurement processes and organizations, and by strengthening the Office of the Secretary of Defense oversight role
- make a sustained effort to improve capabilities to attribute responsibility for BW attacks in a timely and authoritative manner.

6. The operational, policy, organizational, and resource issues associated with the DOD consequence management mission must be confronted and resolved. The importance of homeland defense in the Bush administration vision for DOD—and, more recently, the tragic events of September 11 and the subsequent anthrax releases in the homeland—bring into sharper focus the opportunities and risks inherent in this mission as well as the requirement to expeditiously confront this challenge.

7. Counterproliferation considerations are increasingly integrated into policy guidance and military planning, but the mission area still lacks a clear managerial focus or a fully developed planning framework—and overall remains less than fully mainstreamed. Noticeably lacking today is a strong, senior-level forcing function in DOD. The Department should seek to revitalize, empower, and sustain internal and interagency organizational arrangements that facilitate senior-level direction, authority, and accountability to the counterproliferation mission. To this end, reinvigorating the Counterproliferation Council likely would be a useful near-term step.

8. Finally, the implications of transformation for counterproliferation need to be better understood. On the one hand, the rhetoric of emerging threats suggests increased emphasis on the range of counterproliferation activities and programs. On the other, perceived resource constraints could create downward pressures on passive defense, counterforce and/or other non-missile defense programs. (How resource pressures identified in the May conference may have evolved in the wake of the September 11 attacks or in the context of the war on terrorism is unclear.) Similarly, it will be important to assess the impact of possible reductions in forward-deployed forces as well as of the introduction of new concepts for the employment of military power on operations in NBC environments. The central task: determine how current counterproliferation policies, programs, and plans fit into the future vision for the armed forces being developed in DOD.

This moment of strategic assessment provides an opportunity to take stock of the overall counterproliferation program and in particular the

priorities that have shaped the allocation of resources across and within the various counterproliferation pillars. Surely, improvement in denial capabilities across the board must continue, but we must not be captive to old thinking in advancing this objective. DOD leadership should consider a "zero-based" look at requirements with emphasis on determining whether it is on the right track, how best to balance resource allocation for both near- and longer-term threats, and what the risks are in underresourcing certain activities. This activity would be the most sweeping assessment of the counterproliferation research, development, and acquisition state of play since the Deputy Secretary of Defense conducted an initial DOD-wide review in 1994, and it could revitalize the work of the Counterproliferation Program Review Committee. Canonical assumptions about how best to meet the threat (for example, the applicability of chemical defense concepts to biodefense, or the emphasis in biodefense research and development on technical detectors) must be critically examined to ensure we are making effective preparations for future battlefields. This challenge is at the heart of Secretary Rumsfeld's calls for transformation and is a core defense planning challenge for the 21st century.

Endnotes

[1] George W. Bush, remarks at National Defense University, Washington, DC, May 1, 2001.

[2] Les Aspin, Address to National Academy of Sciences on the Defense Counterproliferation Initiative, Washington, DC, December 7, 1993.

[3] Department of Defense, *Report of the Quadrennial Defense Review* (Washington, DC: Government Printing Office, May 1997), 4.

[4] Office of the Secretary of Defense, *Proliferation: Threat and Response* (Washington, DC: Government Printing Office, January 2001), 78.

[5] George J. Tenet, testimony to the Senate Select Committee on Intelligence on "The Worldwide Threat in 2000: Global Realities of Our National Security," February 2, 2000.

[6] Department of Defense, *Quadrennial Defense Review Report* (Washington, DC: Government Printing Office, September 30, 2001), 14.

[7] Office of the Secretary of Defense, *Annual Report to the President and Congress* (Washington, DC: Government Printing Office, 2000), 19.

[8] Department of Defense, *Quadrennial Defense Review Report* (2001), 11–13.

[9] Ibid., 31–42.

[10] Donald H. Rumsfeld, confirmation hearing testimony to the Senate Armed Services Committee, January 11, 2001.

[11] Joint Chiefs of Staff, *Joint Publication 3–11, Joint Doctrine for Operations in Nuclear, Biological, and Chemical (NBC) Environments* (Washington, DC: Government Printing Office, July 11, 2000), I–3.

[12] The Counterproliferation Council was established in 1996 to provide senior-level oversight of DOD-wide counterproliferation activities as well as interagency and international initiatives. The council is chaired by the Deputy Secretary of Defense and includes senior representatives from the Joint Staff, the services, and the defense agencies.

[13] Joint Chiefs of Staff, *Joint Publication 3–11*, I–1, III–6.

[14] Donald H. Rumsfeld, "Guidance and Terms of Reference for the 2001 *Quadrennial Defense Review*," June 22, 2001, 15.

[15] Counterproliferation Program Review Committee, *Report on Activities and Programs for Countering Proliferation and NBC Terrorism* (unclassified executive summary, April 2000), 2.

[16] Counterproliferation Program Review Committee, *Report on Activities and Programs for Countering Proliferation and NBC Terrorism* (1998), 2–7. Note that these figures reflect 1998 information, the most recent data publicly available. While the executive summaries of subsequent annual reports are unclassified, the full reports, including data on funds allocated by area for capability enhancement, are not. According to the General Accounting Office (GAO), DOD planned to spend approximately $7.3 billion on committee-related activities in fiscal year 2001, roughly $5.3 billion (or almost 73 percent) of which would be allocated for missile defense. See GAO, *Weapons of Mass Destruction: DOD's Actions to Combat Weapons Use Should Be More Integrated and Focused* (NSIAD-00-97, May 2000), 20. Resources in particular areas are likely to increase further in the context of the war on terrorism and military action in Afghanistan.

[17] Steven Lee Myers, "The Targets: Jets Said to Avoid Poison Gas Sites," *The New York Times*, December 18, 1998, A1.

[18] James Risen, "Question of Evidence: A Special Report," *The New York Times*, October 27, 1999, A1; Tim Weiner and Steven Lee Myers, "After the Attacks: The Overview," *The New York Times*, August 29, 1998, A1; Tim Weiner and James Risen, "Decision to Strike Factory in Sudan Based on Surmise Inferred From Evidence," *The New York Times*, September 21, 1998, A1.

[19] One difficulty in articulating a complete biological threat assessment is that it is mobilization capabilities, more than weapons stockpiles, that "count." The continuing spread of dual-use technologies suggests the need to consider virtual proliferation status for a considerably larger number of countries that possess latent BW capabilities that presumably could be made manifest in a weapons program given a national decision to do so.

[20] Office of the Secretary of Defense, *Proliferation: Threat and Response* (Washington, DC: Government Printing Office, January 2001) and Department of Defense, Chemical and Biological Defense Program, *Annual Report to Congress and Performance Plan* (Washington, DC: Government Printing Office, July 2001).

[21] The DOD directive (6205.3) that mandates the Chairman's List provides guidance for the DOD Immunization Program for Biological Warfare Defense. This directive defines a "validated biological warfare agent" as one that is approved as a threat to DOD personnel by the Chairman of the Joint Chiefs of Staff in consultation with the Commanders of the Unified and Specified Commands, the Chiefs of Military Services, and the Director of the Defense Intelligence Agency. At present, the Chairman's List is largely intelligence-driven, based almost entirely on putative adversary possession of known biological agents. No attempt is made to characterize the extent to which particular agents may pose a greater or lesser threat based on the strategic or operational impact it might have or the range of possible medical consequences. See W. Seth Carus and S. Read Hanmer, "The 'Validated' BW Agent Threat Conundrum," NDU Center for Counterproliferation Research, September 2001.

[22] John Wade, "Medical Risk Assessment of the Biological Threat," study prepared for the Department of the Army Office of the Surgeon General (DASG-HCF), May 2001.

[23] Department of Defense, *Chemical and Biological Defense Program Annual Report to Congress* (Washington, DC: Government Printing Office, March 2000), 67.

[24] Bush, remarks.

[25] M. Elaine Bunn, "Strategic Nuclear Forces and National Missile Defense: Toward an Integrated Framework," in Michele A. Flournoy, ed., *QDR 2001: Strategy-Driven Choices for America's Security* (Washington, DC: National Defense University, 2001), 333–36.

[26] Thom Shanker, "For Rumsfeld, A Reputation and a Role are Transformed," *The New York Times*, October 13, 2001, 1.

The Counterproliferation Imperative: Meeting Tomorrow's Challenges

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National Defense University